USER SUPPORT APPARATUS AND SYSTEM USING AGENTS

BACKGROUND OF THE INVENTION

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1. Field of the Invention

The present invention relates to a technique for supporting users in an electronic manner. This invention particularly relates to an apparatus and a system for supporting users by providing information necessary for the users employing agents.

2. Description of the Related Art

Since the Internet access at home has been common recently, WWW (World Wide Web) users are growing rapidly. As it is convenient for the users at home to access to a huge amount of information from all over the world, the number of users is further increasing.

Now users can believe that almost all the necessary information exists somewhere in the huge number of web sites. The number of web sites or pages, however, has become too large for users to reach the information they need although they know that the information exists somewhere in the web sites.

Portal sites with search engines who are aware of the above situation have been trying hard to sophisticate search

methods by, for example, making information hierarchical with
the help of the portal sites, users can efficiently find
necessary information out of the flood of information using
search conditions or formulas including logical OR and
5   logical AND in each topic area predefined by the portal sites.

It becomes, however, extremely difficult for general
users to use highly complicated and logical search formulas
in today's environment where most of the web population is
beginners. The problem is becoming to be more difficult as
10   the hierarchy of information becomes deeper, and the
classification of information is complicated to be instantly
understood. The amount of information will spoil the
utilization of information as the number of sites is still
increasing, and more and more beginners are coming in the web
15   world.

It is therefore an object of the present invention to
help users reach information they need in a friendly virtual
environment. It is another object of the present invention
to provide a technique for supporting users to smoothly
20   conduct operations in computers and other devices.

SUMMARY OF THE INVENTION

25   According to one aspect of the present invention, a
user support apparatus is provided. The apparatus comprises

an agent storage and an agent output unit. The agent storage
stores data of a first agent being dedicated to a user
serving based on information of the user and data of a second
agent being an expert of a specific area, whereas the agent
5   output unit outputs the first and second agents derived from
said data visually or audibly to the user.

In this configuration, the first agent gives a
selection guide to the second agent when the second agent
selects information necessary for providing the service. The
10   process of giving the guide is conducted visibly from the
user.

The first agent therefore reduces user operation as it
acts on the second agent for the user. Another advantage is
that the user can understand that the direction of the job
15   being done by the second agent.

The process of giving the guide is realized just for
showing it to the user. It is therefore not necessary for
the first agent to actually give the guide to the second
agent inside the apparatus. System designers can easily
20   understand it more convenient to provide or design an agent
manager to manage the first and second agents collectively
instead of designing the two agents independently. In this
sense, the agent manager controls the first agent and second
agent as "puppets" inside the apparatus and the guide given
25   from the first agent to the second agent is controlled by the
agent manager outputting images and/or audio data to the user.

Even such a case is, however, described as "the first agent gives a guide to the second agent" in this specification.

The apparatus may further comprise an interface through which the user inputs an instruction. The second agent may

5 select the information putting higher priority on the inputted instruction than the given or presented guide from the first agent. In this configuration, the user can modify, cancel or change the guide given by the first agent, as he/she wants. The interface may comprise a user interface by

10 which the user can input necessary instructions and a request inputting unit provided in the agent manager for accepting requests from the user.

According to another aspect of the present invention, a user support apparatus is provided. The apparatus comprises

15 a front processor which works at a user interface level and a middle processor which handles and stores data to be presented to the user via the front processor. The front processor comprises an agent storage which stores the data of a first agent being dedicated to the user serving based on

20 information of the user and data of a second agent being an expert of a specific area. The first and second agents are designed in such a manner that the first agent, when the second agent requests the middle processor provide information necessary to serve the user, presents a selection

25 guide to the second agent based on the user information in the manner that the user can recognize the presentation of

the guide.

The front processor may have a functional block to make the user interact with the apparatus, realized by software, hardware or any combinations of the two. In this

5   configuration, the middle processor serves for the user as an information accumulator and manager, and can provide information necessary for the user more efficiently in general. "The middle processor" does not necessary assume the existence of a back processor or any other processors.

10   According to still another aspect of the present invention, a user support apparatus is provided. The apparatus comprises a front processor which works at user interface level and a back processor which acquires data to be presented to the user from outside. The back processor

15   may comprise an agent providing unit which sends said data to the agent storage. In this configuration, also the first and second agents collaborate in an aforementioned manner. The back processor may acquire the latest agent data and information necessary for the user from, for example,

20   arbitrary web sites connected to the Internet. Here, the "back processor" does not necessary assume the existence of the middle processor or any other processors.

The back processor may function as a server for serving the agent data to the front processor via the Internet or any

25   other networks. The server can be configured in various manners such that the main functions remain at a server side

like CGI or Common Gateway Interface, the main functions are
transferred to the client side like a Java (trademark) applet
or Active X (trademark), and an API or Application Program
Interface type where the main functions are provided at both
5   the server and client sides like a Java application.

       In this configuration, the agent storage may store a
local agent which has existed in the front processor without
provided from the back processor and a remote agent which has
come to exist provided from the back processor. The local
10   agent is convenient in that it is generally easily customized
in each apparatus and is available even when the apparatus is
in an off-line state. The remote agent on the other hand is
convenient in that it can be sent from the user to a
plurality of apparatuses and is generally easily updated or
15   registered at the server end. The local agent and remote
agent may be provided to the user in such a manner that the
user cannot distinguish them so that a seamless environment
may be provided.

       According to still another aspect of the present
20   invention, a user support apparatus is provided. The
apparatus comprises memory, program modules loaded on the
memory and a CPU to execute the modules which may include
functions of executing a first agent and a second agent, the
first agent being represented as a character to bridge the
25   user and the apparatus and to serve the user in a user-
dependent manner based on information of the user, and the

second agent being represented as a character to bridge the
user and the apparatus and to serve the user for a specific
area as an expert thereof. In this configuration, the first
agent, when the second agent selects information necessary to
5   serve the user, presents a selection guide to the second
agent based on the user information whereby the user can
recognize the presentation of the guide.

According to still another aspect of the present
invention, a user support apparatus is provided. The
10   apparatus comprises an agent storage which stores data of a
first agent and a second agent which bridge a user and the
apparatus and an agent outputs unit which outputs the first
and second agents derived from said data. The first and
second agents are so designed to collaborate while having
15   conversion or dialog recognizable from the user when the user
requests a given or arbitrary service. The conversation may
show the process to optimize the service for the user. The
user can understand the process from the conversation.

According to any one of the aforementioned aspects, a
20   user-friendly agent can let the user know the processes
conducted in the apparatus so that the user can judge the
processes are correctly performed for him/her.

The middle processor may comprise a meta information
generator which generates meta information by analyzing a
25   page which is a collective of data necessary for the user and
which is provided from the back processor, and a write

controller which stores the page and the meta information in a local memory device by associating them. "Meta information" corresponds to the information with regard to the page after "meta data" meaning "data with regard to data".

5   In this configuration, the page and meta information are combined, one being embedded in another or the two being linked to be associated with. The combination is then stored in a local memory device. The user can roughly understand or search the content or subject of the page using the meta

10   information. The page can be retrieved from the local memory generally faster than a global search as long as the page exists in the local memory or a cache memory.

The meta information generator may further comprise a keyword detector to detect keywords in the page, a subject

15   analyzer to analyze the subject intention, purpose or theme of the page, and a meta information extractor to extract meta information from the page based on the theme analyzed. The extracted meta information is stored in the memory device associated with the page.

20   The meta information generator may further comprise a pre-check unit to judge whether the page is a desired page based on the detected keywords. When the page is not a desired page, the page may not be stored in the memory device. Contrarily, the page may be stored in the memory device when

25   the page is judged to be the desired one.

The middle processor may comprise a cache search unit.

The cache search unit may judge whether the desired page already exists in the local memory device by matching the keywords with the meta information stored in the memory device. The cache search unit may instruct to read the page

5   from the memory device when the page is judged to exist in the memory and may instruct to retry search for the page when it is not judged to exist in the memory. A page found by the retry search may be inputted to the meta information generator and the meta information generated may be

10   associated with the page and is stored in the memory.

The middle processor may further comprise a search pre-processor to support the search conducted by the back processor by manipulating the keyword reflecting the intention of the user in a predetermined manner. The search

15   pre-processor may comprise a condition adding unit to add a keyword which is made objective based on the intention of the user assumed from the keyword reflecting the intention of the user and search condition setting unit to set a search condition or formula including, for example, a logical OR in

20   accordance with the original keyword and the added keyword. The added condition may be reflected in the guide given from the first agent.

The middle processor may further comprise a pre-search controller to predefine information the user may inquire,

25   based on the personal information of the user. In this configuration, the middle processor may instruct the back

processor to search, while the apparatus is not used by the
user, for the assumed or anticipated information without an
expressed instruction from the user. Pages thus acquired
may be stored in the memory device together with the meta
5   information so that the response to the user's future request
is improved.

In one aspect of the present invention, the middle
processor is implemented in a home server and the front
processor is implemented in a device controlled by the home
10 server. The front processor may present the operational
information of the device, for example, control or status
information of the device to the user and the middle
processor may manipulate or improve the operational
information and send it to the front processor.

15 In another aspect of the present invention, the back
processor may be implemented in a server on a network for
example in a web server. And the front processor may be
implemented in a device, for example, a PC, a mobile terminal
such as a mobile phone, which can access to the server. The
20 front processor may accept a request for indicating
information from the user and the back processor may acquire
the requested information from an arbitrary information
source on the network and send it to the front processor.

According to still another aspect of the present
25 invention, a user support apparatus is provided. The
apparatus comprises an agent controller which provides an

agent to support a user, a request analyzer which analyzes a request input from the user, and a response controller which presents to the agent controller necessary information for the requested service when the service has been judged

5   processible and otherwise records the requested service as an unattained service. The apparatus may further comprise a communication unit which electronically reports the recorded unattained service to the administrator of the apparatus.

      The "request" may have a specific purpose such as

10   "Teach me how to operate a PC" or may be a chat just like "Hello" to have a dialog with an agent. In this sense, "necessary information" may relate to the operation of a PC or to utterance data corresponding to each scene. "Utterance" in this specification refers not only to actually uttered

15   words but also inputted text-based requests/responses to/from the agents and the like.

      There are at least two cases where the service is judged not processible. In the first case, the request could not be analyzed or interpreted, whereas in the second case,

20   information to respond to the request could not be found even though the request itself was properly interpreted. There are at least two cases where the information could not be found. In the first case, the information could not be found inside the apparatus, whereas in the second case, the

25   information could not be found even after the search was conducted outside the apparatus. Contrarily the service is

judged processible when the request is understood or
interpreted and necessary information to cope with the
request exists. A series of processes to handle the request
is performed in an electronic manner and the term

5 "understand" or "interpreted" is not necessarily used in the
sense that a human can understand the request.

There are at least two meanings of "recording the
requested service as an unattained service". In the first
meaning, the unattained service is recorded with an

10 identifier while storing all the request in a log file. In
the second meaning, only the unattained service is recorded
when it is detected.

According to still another aspect of the present
invention, a user support apparatus is provided. The

15 apparatus comprises an agent controller which provides an
agent to support a user, a conversation or dialog data
storage which stores conversation to be held between the user
and the agent, an request analyzer which analyzes a request
input from the user, a response controller which determines a

20 response to the request based on result of the analysis, and
a log storage which stores the log of conversation actually
held between the user and the agent. The response controller
presents to the agent controller necessary information, read
from the conversation data storage, for the requested service

25 when the service has been judged processible and otherwise
records in the log storage the requested service as an

unattained service.

The "response" can be made regardless of whether the service is judged processible or not. An agent can "apologize" the user when the service is judged not processible. In this case, a front end process works to apologize the user and a back end process works to record the unattained service so that the system improvement on conversation data, an algorithm for analyzing the request and the sophistication of information search necessary for the service become possible.

According still another aspect of the present invention, a user support apparatus is provided. The apparatus comprises a first processor which conducts an agent level control and a second processor which conducts a character level control. The first processor comprises a total system manager which provides a field for a plurality of agents to interact and manages the agents, and a plurality of agent controllers each of which, through a character, acquires and interprets a user request so as to realize substantial functions of a respective agent. The second processor comprises a character manager which provides basic functions to visually represent interaction between the plurality of agents at the character level, and a plurality of character controllers, each of which corresponds to one of the agent controllers and provides a series of character actions to the corresponding agent controller for use therein. Interface

between a "horizontal" function between the plurality of
agents which is provided by the total manager and the
character manager, and a "vertical" or an individual function
provided by agent controller and the character controller, is
predetermined for the plurality of agent controllers and the
plurality of character controllers.

In this apparatus, the total support manager and the
character manager have a function which works on a plurality
of agents simultaneously. These managers therefore have a
horizontal function to explicitly or implicitly work on a
5   plurality of characters. On the other hand, the gent
controller and the character controller have a vertical
function which works on a specific agent. The interface
between the horizontal and the vertical functions is
standardized, which makes it possible to add a vertical
10 function or an agent-dependent function later according to
the interface. The interface allows to design new agent-
dependent functions so that agent system is easily improved.

Characters can interact, for example, appear on the
same screen and talk with each other as the interface absorbs
15 the difference of the input/output formats of the characters.
Conventionally, agents developed in different companies
usually cannot communicate with each other. The present
apparatus, however, realizes the communication by
implementing agents obeying the interface. Based on this
20 feature, a new type agent system is provided.

According to still another aspect of the present invention, a client-server system using a character to support a user is provided. In this system, the client comprises a first processor which conducts an agent level control and a second processor which conducts a character level control. The first processor comprises a total system manager which manages a plurality of agents to achieve interaction therebetween, and a plurality of agent controllers each of which, through a character, acquires and interprets a user request so as to realize substantial functions of a respective agent. The second processor comprises a character manager which represents the interaction between the plurality of agents at the character level, and a plurality of character controllers, each of which corresponds to one of the agent controllers and provides a series of character actions to the corresponding agent controller for use therein. In this system, the server, collaborating with the client, interprets the user request and presents to the client information necessary to respond the request.

The server may further comprise a control window manager which provides functions of the total manager and the character manager to the client. The server here may be any element, component, module, unit, device and the like which can provide a service to the client. The server may comprise a plurality of expert or specialized servers, each of which,

for service in specific area, provides functions of the agent
controller and the character controller to the client.

According still another aspect of the present invention,
a user support method using a character is provided. The
method conducts agent level control and character level
control. The agent level control provides a total management
process to manage a plurality of agents to achieve
interaction therebetween and a plurality of agent control
processes, each of which responds to a user request via a
respective character. The character level control provides a
character control process to represent the interaction
between the agents at the character level and a plurality of
character control processes, each of which corresponds to one
of the agent control processes and provides a series of
character actions to the corresponding agent control process.
The interface between a horizontal function among the
plurality of agents and a function individual to each agent
is predetermined for the plurality of characters.

According to still another aspect of the present
invention, a user support apparatus is provided. The
apparatus comprises a user utterance identification block
which comprises an electronic user utterance list holding
assumed or anticipated utterances and identifies a user
utterance when it is inputted, a plurality of response blocks,
each of which makes one of agents being designed to have a
respective specific area, respond to the inputted utterance

when the utterance is included in the specific area assigned
to the agent, and a registration unit which stores in a
storage region provided for each specific area a network
address of an web site according to a request of the user.

The "action" of an agent may be an imitated utterance,
an image, a behavior and any other activities to be performed
to support the user. In this sense, the action may relate to
any process element or process flow. The e "storage region"
relates to a conceptually single physical entity to classify
the network addresses of web sites as bookmark information.
The region, however, is not necessarily a single physically
continuous area. The storage region works as a folder to
classify files. A single folder may have subfolders in it so
that the bookmark information may be layered.

The response block may comprise a search unit which
searches a web site having information desired by the user
therein. The registration unit stores the network address of
the searched web site to a storage region assigned to the
response block having the search unit which conducted the
search.

The apparatus may further comprise a display unit which
presents registered web sites classified to the storage
regions.

According to still another aspect of the present
invention, a user support system is provided. In this system,
a plurality of user support apparatuses are connected to the

network as independent nodes. Each apparatus has its own

specific area. Each apparatus stores a respective response

block while having the utterance identification block

commonly with other apparatuses. The identification block is

stored in one of the apparatuses. In this configuration, the

apparatus containing the identification block in it may act

as an entrance or portal server which can specify all the

user utterances processible in the system. Based on the

specified utterance, a suitable apparatus may be selected.

The system efficiency can be improved as the system load is

distributed by assigning the identification of the user

utterance and the response from an agent to a plurality of

nodes.

     In this system, the user utterance collection may be

provided by a library providing unit to any developers who

wish to use the collection. The library providing unit may

transmit the collection in an off-line or on-line manner.

Off-line distribution may be realized with a normal mail.

For on-line distribution, a server managing the user

utterance collection therein may be provided. The use right

of the library site is then licensed. In the user utterance

collection, a general utterance library recording general

utterances of users in a library described in natural

languages may be licensed. According to this license scheme,

a third party can develop its own user utterance collection

and an agent action collection independently to realize its

own user support apparatus, which eventually improves the
functionality of the entire user support system.

    According to still another aspect of the present
invention, a user support apparatus is provided. The
apparatus comprises a user utterance identification block
which comprises an electronic user utterance list holding
assumed or anticipated utterance and identifies a user
utterance when it is inputted, and a response block which has
an electronic agent action library to respond to the
utterance and which makes an agent respond to the utterance,
a search item holder which acquires and holds in advance
items of information the user wishes to search, and a search
unit which conducts search for the items. The utterance
identification block further comprises an additional
utterance list containing utterances for which the search
unit is planed or programmed to start the search. The search
unit starts the search when the user utterance is detected
contained in the additional utterance list.

    The content of the additional utterance collection may
be included in the user utterance collection so that the user
utterance collection may have the content of both of
additional utterances and user utterances in this apparatus.
In this configuration, a user utterance can be searched in
the user utterance collection and the additional utterance
collection simultaneously.

    The search unit may start the search spontaneously

without an instruction from the user. In this configuration, a quick response can be realized when the user requests a certain information as the search for information has been conducted beforehand. The searched information may be presented to the user without a user request. The search may be performed periodically or in hours when the network is not busy.

In this apparatus, each field of information may be associated with a character. The apparatus may further comprise a character display unit which presents to the user result of the search in the form of an utterance of a character which is associated with a field to which the search result is classified. In this configuration, the character appears to search for the information spontaneously so that a friendlier environment can be provided.

In this apparatus, the search item holder may further comprise a bookmark holder which stores the network address of a web site. The search unit acquires update information of the web site. The character display unit presents the user the update information in the form of an utterance of a character when a web site which is classified to a field with which the character is associated.

The present invention has been summarized according to several aspects thereof. These aspects are, however, only examples and arbitrary combinations of the above aspects or the elements therein are also effective.

BRIEF DESCRIPTION OF THE DRAWINGS

5   Fig. 1 is a block diagram of the user support apparatus according to Embodiment 1.

Fig. 2 is another block diagram of the user support apparatus according to Embodiment 1.

Fig. 3 is still another diagram of the user support
10   apparatus according to Embodiment 1.

Fig. 4 is still another diagram of the user support apparatus according to Embodiment 1.

Fig. 5 illustrates the configuration of the apparatus shown in Fig. 1.

15   Fig. 6 shows the internal structure of the agent storage in the front processor.

Fig. 7 shows the internal structure of the agent manager in the agent storage.

Fig. 8 is an information table generated as a subset
20   of the personal information database to be referred to when a recipe is presented to the user.

Fig. 9 is a block diagram of the meta information generator in the middle processor.

Fig. 10 illustrates a meta information file generated
25   in the middle processor.

Fig. 11 shows a collection of the meta information

file and page data.

Fig. 12 shows the meta information file and page data associated with each other using link information.

Fig. 13 illustrates the structure of a search pre-processor in the middle processor.

Fig. 14 is a reference table provided in the search pre-processor of the middle processor.

Fig. 15 is a flowchart showing the process to read a target page from the cache memory or to store the page in the cache memory.

Fig. 16 is a flowchart to acquire beforehand a page which the user may need.

Fig. 17 illustrates a screen which first appears when the user uses an agent.

Fig. 18 illustrates a screen on which a recipe agent is called by a user-dedicated agent.

Fig. 19 shows the result of the initial search by the recipe agent.

Fig. 20 shows the result of the secondary search by the recipe agent.

Fig. 21 is a flowchart for a service to be performed when the user issues a request.

Fig. 22 illustrates the configuration of an apparatus according to Embodiment 2.

Fig. 23 is a flowchart showing the process to initiate an agent in Embodiment 2.

Fig. 24 illustrates the interaction between the user and the agent in Embodiment 2.

Fig. 25 illustrates the interaction between the user and the agent in Embodiment 2.

5   Fig. 26 illustrates the interaction between the user and the agent in Embodiment 2.

Fig. 27 illustrates the interaction between the user and the agent in Embodiment 2.

Fig. 28 illustrates the interaction between the user
10   and the agent in Embodiment 2.

Fig. 29 illustrates the interaction between the user and the agent in Embodiment 2.

Fig. 30 is the internal block diagram of the log storage.

15   Fig. 31 shows an unattained request list.

Fig. 32 shows the configuration of a client-server system according to Embodiment 3.

Fig. 33 shows the structure of a control window management site according to Embodiment 3.

20   Fig. 34 shows the structure of a chat server according to Embodiment 3.

Fig. 35 shows the structure of an index file contained in the chat server.

Fig. 36 shows the structure of an assumed utterance
25   collection contained in the chat server.

Fig. 37 shows the structure of an access information

file contained in the chat server.

Fig. 38 shows the structure of an action file
contained in the chat server.

Fig. 39 shows the structure of a user terminal which
5   is a client machine.

Fig. 40 illustrates a chat agent which appears when
the user terminal is initiated.

Fig. 41 illustrates a recipe agent which appears
together with the chat agent when the user asks about recipe.

10   Fig. 42 illustrates the dialog held between the chat
agent and the recipe agent.

Fig. 43 illustrates a scene where the recipe agent
presents the search result to the user.

Fig. 44 shows a scene where a third agent or a travel
15   agent appears to respond to the user.

Fig. 45 shows the entire structure of a network system
including a user support system according to Embodiment 4.

Fig. 46 shows the structure of an originating server
included in the user support system.

20   Fig. 47 shows the structure of the user utterance
collection contained in the originating server.

Fig. 48 shows the structure of an access information
file contained in the originating server.

Fig. 49 shows the structure of a bookmark file
25   contained in the originating server.

Fig. 50 shows the structure of a gourmet server

contained in the user support system.

Fig. 51 shows the structure of a user terminal used in the user support system.

Fig. 52 illustrates a local agent which appears when the user terminal is initiated.

Fig. 53 illustrates a chat agent which appears when the user speaks.

Fig. 54 illustrates a gourmet agent which appears when the user asks a question regarding a Peking ravioli restaurant.

Fig. 55 illustrates a screen where the gourmet agent presents the search result to the user.

Fig. 56 illustrates a screen where a registered bookmark information is presented to the user.

Fig. 57 shows the internal structure of the originating server.

Fig. 58 shows the internal structure of an additional index file.

Fig. 59 shows the internal structure of an additional user utterance collection.

Fig. 60 shows the internal structure of the gourmet server.

Fig. 61 shows the internal structure of the favorite data.

Fig. 62 shows the structure of a page stored in the agent action library.

Fig. 63 shows the screen displayed based on the page.

Fig. 64 shows the screen in which the favorite register accepts the registration of a bookmark from the user.

Fig. 65 shows the screen in which a favorite character registered by the user is displayed.

Fig. 66 shows the screen in which Gourmet Agent presents the search result.

DETAILED DESCRIPTION OF THE INVENTION

The invention will now be described based on the preferred embodiments, which do not intend to limit the scope of the present invention, but exemplify the invention. All of the features and the combinations thereof described in the embodiments are not necessarily essential to the invention.

Embodiment 1

A user support apparatus according to embodiment 1 supports a user employing two types of agents. The first agent or a user-dedicated agent provides services to the user in one-to-one relation with the user to be friendly to the user. The second agent or an expert agent has its own specific area such as information search and so on responsive to the user's request.

The first agent generally has more opportunities to

contact the user and accumulates the personal information of the user such as purchase record, food, hobby, health condition and so on. The first agent presents a guide to the expert agent for the user when the expert agent acts for the

5   user.

When the user, for example, requests the movie expert agent to recommend new arrivals, the first agent, knowing the user's preference as "horror" and "love comedy", may utter on the screen, "Let us know very horrible ones" or "Try to find

10 lovely and funny ones". Then the second agent may respond, "Trust me. Wait for a moment."

From the conversation between the agents, the user can understand the search process is conducted properly. The more precisely the first agent can convey the feeling of the

15 user, the more the user feels convenient with the first agent. The user may feel intimacy with the first agent as a virtual pet. The more intimately the user feels with the first agent, the more easily the first agent can collect the personal information of the user as a general tendency. The image or

20 any other appearance of the first agent may be selected by the user or may be designed by the user.

The purpose of the present embodiment is almost achieved if the conversation between the agents is funny. In conventional search methods, for example, "Now searching.

25 Please wait for a moment" or the like may be displayed but the user is not saved. According to the present embodiment,

the agents can give a relaxation to the user while the user
is waiting for the search result, by playing a comic chat.
The agents are mainly described in Figs. 6 to 8 and Fig. 17
and later.

5   Figs. 1 to 4 illustrate various types of user support
apparatuses according to the present embodiment. In any case,
the apparatus comprises an arbitrary combination of a front
processor 12, a middle processor 14 and a back processor 20,
which are the three major processing units. The front
10 processor 12 interacts with the user. The middle processor
14 supports the front processor 12 behind it and acquires and
stores necessary information in the format the user needs.
The back processor 20 collects necessary information from the
Internet and provides it to the middle processor 14. The
15 back processor 20 further, as a server, provides expert
agents described later to more efficiently support the front
processor 12.

          In Fig. 1, the user support apparatus comprises the
front processor 12 and the middle processor 14 implemented in
20 a PC 10. The apparatus may include the back processor 20. It
should be noted that the degree of freedom to combine the
processors is high. The middle processor 14 communicates
with the back processor 20 implemented in a web server 18 via
the Internet 16.

25   In Fig. 2, the front processor 12 is implemented in a
home electric appliance 30 and the middle processor 14 is

implemented in a home server 32. The middle processor 14
communicates with the back processor 20 implemented in the
web server 18 via the Internet 16. The home appliance 30 may
be an audio-visual appliance such as a digital television set,

5   a VCR and a digital camera. The home appliance 30 may be a
traditional appliance such as a refrigerator and a washer, or
may be any other appliances including a home security
appliance having sensors. In any case, the home appliance 30
is managed by the home server 32. The front processor 12,

10   for example, manages information displayed on a LCD panel
provided on a refrigerator, obtains user's instruction with
regard to the icebox and informs the user of the condition of
the icebox. The middle processor 14 on the other hand may
display "today's recipe" and other information which is

15   beyond the normal operational information of the refrigerator.

In Fig. 3, the front processor 12 is implemented in a
mobile terminal 40 such as a cellular phone and the middle
processor 14 and the back processor 20 are both implemented
in the web server 18 where the mobile terminal 40 and the web

20   server 18 communicate via the Internet 16. In this
configuration, the middle processor 14 is also implemented in
the web server 18 and the mobile terminal 40 is comparably
easily realized in a small body of the terminal.

In Fig. 4 the configuration is almost the same as Fig.

25   3, but only the back processor 20 is implemented in the web
server 18. The middle processor 14 is skipped to provide a

simplified service.

Fig. 5 is a block diagram of the user support apparatus according to the configuration shown in Fig. 1. The PC 10 may be a normal computer and comprises a PCU, memory and

5 program modules to support users loaded on the memory. The blocks here are drawn in terms of functions characteristic to the present embodiment and the skilled in the art can understand the blocks can be realized with hardware only, software only or any other combinations of the two.

10 The front processor 12 and the middle processor 14 are implemented in the PC 10. The back processor 20 is implemented in the web server 18. The PC 10 and the web server 18 communicate via the network. In Fig. 5, the middle processor 14 and the back processor 20 are drawn closely, but

15 in reality the Internet 16 exists between the two.

The front processor 12 has a user interface or UI 100 to input the user's instructions and to conduct any other user-related matters. The UI 100 may comprise an input device such as a keyboard and a mouse, a display device to

20 display information to the user, and GUI and other programs.

An agent storage 104 has object data describing agents to support users. The object data may be hereinafter simply referred to as "the data" or "the agent data". An agent output unit 102 outputs the agents to the user including the

25 first and the second agents.

The first agent is user-dedicated and is provided by an

agent providing unit 134 for each user in order to obtain the personal information of the user. The personal information is used for customizing services conducted by the second agent. The user-dedicated agent has a function to chat with

5   the user to acquire the personal information. The function is made active when the agent has been frequently used by the user. For example the agent is switched to a "friend" internally when the number of contacts between the user and the agent reaches a predetermined value.

10   The second type agents are experts for each specific area such as cooking, movie, travel, PC, new products and shopping. The second agents conduct information search and provide desired information to the user.

        From a different criterion, the agents are classified

15 to "local agents" and "remote agents". The local agents are originally held by the front processor 12 in a local environment and provide guidance information concerning the PC 10 to the user. The local agents may be realized with the functions of the OS of the PC 10, with the functions of

20 application programs implemented in the PC 10, or with other functions. The local agents and the remote agents may be designed in such a manner that the user cannot distinguish them.

        The remote agents are provided by the agent providing

25 unit 134. The remote agents may stay in the agent storage 104 after downloaded to the agent storage 104 or may be

deleted from the agent storage 104 after the session between the PC 10 and the web server 18 is finished. The user may select whether the remote agents should stay or should be deleted. Here, the remote agents are mainly described

5   although the user-dedicated agents and the expert agents may be local.

An agent processor 106 conducts necessary processes when the user issues an instruction to any one of the agents via the UI 100. The agent storage 104 and the agent output

10   unit 102 work as a mechanism to output the agent to be shown to the user, whereas the agent processor 106 works as a mechanism to input user instructions to the agent and to send the instructions to the middle processor 14.

When the user asks an expert agent to provide

15   information, the agent inquires the necessary information to the middle processor 14 reflecting a guide given from the user-dedicated agent. The middle processor 14 reads necessary information from a cache memory 120 when it is stored in the memory 120 and sends it to the expert agent.

20   When the necessary information is not stored in the memory 120, the middle processor 14 instructs the back processor 20 to acquire the necessary information from an arbitrary site on the Internet 16 and to send it to the middle processor 14. Information thus obtained via the Internet 16 is hereinafter

25   referred to as a "page" after the file format of HTML. The middle processor 14 modifies the page sent from the back

processor 20 to store in the cache memory 120 for future use,
while providing it to the user.

A search unit 130 of the back processor 20 searches for
the page requested from the middle processor 14 via a

5   communication unit 132. The search unit 130 may be a meta
search engine which can conduct search simultaneously using
multiple search engines existing outside the apparatus. In
that case, the search process is generally more efficient and
reasonable.

10   An agent controller 140 of the agent providing unit 134
generates and manages remote agents and provides them as
object data to the front processor 12. The object data
includes image data, chat data and other attribute data to
provide characters to the remote agents. When the user gives

15   a task to an agent in the front processor 12, the task is
obtained at the agent controller 140 and necessary action
such as search is fulfilled.

A user information DB 150 stores the personal
information of the user obtained through questionnaires, chat

20   with agents and other routes in order to provide information
to fit to the user preference and to more efficiently
customize the functions of the user-dedicated agents.

Fig. 6 illustrates the object data developed inside the
agent storage 104. An agent manager 500 manages expert

25   agents 504 including the user-dedicated agent 502 and a
recipe agent 506. The user-dedicated agent 502 is a "chat

agent" whose main function is to chat with the user. Now the
recipe agent 506 is described as an expert agent. The agent
manager 500 controls the actions and conversation of the
agents by selecting necessary chat data and the like from a
5   dialog data storage 508 and by sending the data to the agent.

Fig. 7 illustrates the internal structure of the agent
manager 500. A request input unit 510 acquires a user
request via the UI 100. The acquired request 518 is sent to
a keyword extractor 108, which extracts keywords in a manner
10   described later.

The extracted keyword 522 is sent back to a guide
presenting unit 512 of the agent manager 500. The unit 512
obtains user information from a personal information DB 118
and generates a guide which should be given from the user-
15   dedicated agent 502 to the recipe agent 506.

The generated guide 524 is sent to a search pre-
processor 110 and a dialog processor 514. The search pre-
processor 110 sets a search condition or formula taking the
guide 524 into consideration. The dialog processor 514
20   extracts from a dialog data storage 508 based on the guide
524, conversation data which the user-dedicated agent 502
should utter and another conversation data which the recipe
agent 506 should utter to respond to the user-dedicated agent
502, and sends the data to the user-dedicated agent 502 and
25   recipe agent 506, respectively. The agents utter the
conversation data.

The user may enhance, modify or deny the guide 524 and input another instruction when the user-dedicated agent 502 shows the guide 524 to the expert agent in manner recognizable from the user, for example, by displaying on the screen or by voice. The instruction from the user is also obtained by the request input unit 510 and is transmitted to the guide presenting unit 512 indicating that the instruction, which is hereinafter referred to as a "priority instruction 520", has higher priority than the guide 524. The guide presenting unit 512 generates another guide 524 in accordance with the priority instruction 520 and transmits it to the search pre-processor 110 and the dialog processor 514. In this manner, the service by the agents is modified.

An agent introduction unit 516 functions to make the user-dedicated agent 502 introduce expert agents such as the recipe agent 506 to the user. This function is initiated when the user-dedicated agent 502 calls an expert agent suitable for the request of the user. The dialog processor 514 retrieves, from the dialog data storage 508, conversation data necessary to introduce the expert agent. The retrieved data is transmitted to the user-dedicated agent 502. The user-dedicated agent 502 introduces the functions and roles of each expert agent to the user.

Fig. 8 illustrates a subset 118a which is extracted from a personal information DB 118 to recommend a recipe to the user under the collaboration of the user-dedicated agent

502 and the recipe agent 506. The subset 118a comprises a

preference column 530, a column of recent meals 532, a health

condition column 534, a column indicating user's unfavorite

foodstuff 536, a budget 'A' column indicating the acceptable

5   budget for ordinary meals 538 and a budget 'B' column

indicating the acceptable budget for special dinner 540.

According to Fig. 8, the user likes Chinese food. The user

recently had Chinese (C), Chinese, Japanese (J), Chinese,

Italian (I), Japanese, Japanese... as his/her meal. The

10 health condition of the user is generally good but the blood

pressure is a little high. The user dislikes shellfish and

onion. The budget A is 800 yen and the budget B is 2000 yen.

In this circumstance, when the user inputs a request

"Recommend a recipe", the request is acquired by the request

15 input unit 510 although the user believes that the request is

accepted by the user-dedicated agent 502. The keyword

extractor 108 extracts keywords such as "recipe", "recommend",

which are returned to the guide presenting unit 512. The

guide presenting unit 512 generates a guide 524 such as "not

20 salty" referring to the health condition described in the

subset 118a. The guide 524 is transmitted to the search pre-

processor 110 and is ANDed to the keywords described later to

limit the number of candidates to recommend.

The guide 524 is also transmitted to the dialog

25 processor 514. The user-dedicated agent 502, under the

control of the dialog processor 514, talks to the recipe

agent 506 "Don't choose salty ones". By this time, the
search pre-processor 110, knowing the guide 524, has prepared
the actual search, which is executed by the search unit 130.
The user-dedicated agent 502 shows the process to the user by
5   the conversation with the recipe agent 506. The response of
the recipe agent 506 may be simply as "Wait for a moment".
The response may be prepared such that it is independent from
the guide given by the user-dedicated agent 502.

   The guide presenting unit 512 may detect, referring to
10 the history column 532, that the user has recently had so
many Chinese meals and may make the user-dedicated agent 502
utter "Don't recommend Chinese food", "Recommend Japanese or
Italian food". In the same manner, the guide presenting unit
512 may make the user-dedicated agent 502 utter, referring to
15 the unfavorite stuff column 536, "Avoid shellfish " and
"Below 800 yen" referring to the budget A column 538.

   The guide 524 from the guide presenting unit 512 may be
considered when the search pre-processor 110 generates the
search condition. Otherwise the guide 524 may be introduced
20 when the search result by the search unit 130 has too many
hits or when the search result contains too many pieces of
information the user do not desire. The guide presenting
unit 512 therefore may issue the guide 524 at several
different timings checking the search process or result.

25   The guide presenting unit 512 for example makes the
user-dedicated agent 502 utter "You recommended the same

recipe yesterday", "Don't exceed the budget", "Avoid onion"
when the search result is revealed without giving the guide
524.   In a background process, the guide presenting unit 512
may generate the guide 524 in the form of keywords such as

5   "budget below 800 yen", "NOT onion" to exclude "onion" in the
search and sends the guide 524 to the search pre-processor
110.   Receiving the guide 524, the search pre-processor 110
creates a new search condition and sends it to the search
unit 130, which retries search to find recipe information

10 more suitable for the user.

The guide presenting unit 512 may generate many guides
524 referring to the subset 118a to limit the candidates when
the search result includes too many information items.   The
guide presenting unit 512 may ask the user "We found too many

15 items. Do you have any specific preference?" to acquire more
keywords when the search result includes too many items even
after the injection of many guides 524.

The user, on the other hand, may input "I like Chinese
food" when the user-dedicated agent 502 says "Don't recommend

20 Chinese food" to the recipe agent 506.   The utterance of the
user is handled as a priority instruction 520 and is provided
to the guide presenting unit 512, which initiates search over
Chinese recipe.

The user-dedicated agent 502 may ask questions to the

25 user when the request inputted from the user is unclear.   The
user-dedicated agent 502 may first ask "Which food do you

prefer 1.Chinese 2.Japanese 3.Italian…?". The user-dedicated

agent 502 may then ask "Which foodstuff do you like 1.pork 2.

meat 3.chiken 4.fish 5.vegetable…?" when the user shows

"1.Chinese" to the first question.

5   The search by the recipe agent 506, which is in reality

conducted referring to the preference column 530, may take

time. The user-dedicated agent 502 may have conversation

with the recipe agent 506 to give a relaxation to the user.

The user-dedicated agent 502 may start conversation with the

10 recipe agent 506 when the duration of the search exceeds a

predetermined value. The duration may be measured by a timer

which is provided in the user-dedicated agent 502 or in any

other part of the apparatus. The user-dedicated agent 502

(simply referred to as "502" in the following conversation)

15 may complain to the recipe agent 506 (simply referred to as

"506") for the user as follows.

       (502) "Are you still searching! Are you really

professional?"

       (506) "It's you who should help me if you have time to

20 complain."

       (502) "You always say 'Don't touch my job. I'm

professional.' Was it a lie?"

       (506) "I don't tell a lie except to my wife. That's why

we can live happily."

25   (502) "It is persuasive."

       Many dialog templates can be prepared beforehand, as

scenes where the agents should give a relaxation to the user
are limited to a few cases.

In Fig. 5, the front processor 12 can provide agent
services to the user with the help of the back processor 20.
5   In that sense, the middle processor 14 is not indispensable
for the collaboration of the front processor 12 and the back
processor 20. The middle processor 14, however, plays an
important role to more efficiently support the user by
managing pages requested by the front processor 12. The
10   middle processor 14 is now described.

An agent processor 106 acquires a request inputted via
the recipe agent 506. The request generally takes a form of
a natural sentence as "Let me know a good recipe on meat".
The user naturally may input the request with independent
15   keywords from the beginning. It is assumed here that the
user inputs a request with a natural sentence.

The keyword extractor 108, receiving the request,
decomposes it to minimum units or words and extracts keywords,
such as "meat", "food" and "recipe", to reflect the intention
20   of the user. The obtained keywords are hereinafter referred
to as "initial keywords" to be distinguished from keywords
given by the search pre-processor 110 described later.

The initial keywords are transmitted to the search pre-
processor 110. The search pre-processor 110 deletes
25   unnecessary keywords and generates more objective and
suitable keywords, which are hereinafter referred to as

"objective keywords", as the initial keywords have not

necessarily been selected to be most suitable for the search.

Keywords not having been deleted, which hereinafter referred

to as "selected initial keywords", are then logically ANDed

5   or multiplied with the objective keywords. The result by the

AND operation is then logically ANDed with the guide 524

endowed by the guide presenting unit 512 of the agent manager

500, and the final result is transmitted to the search unit

130 of the back processor 20 as a search condition in the

10   form of a formula.

The search unit 130 conducts search over web sites and

pages using the search condition via the communication unit

132 and the hit information items, which hereinafter referred

to as "target pages" are obtained and sent to the agent

15   controller 140 or directly to the agent processor 106.

The target pages are also sent to a meta information

generator 116, which generates necessary meta information and

stores the information with the target pages in the cache

memory 120. The information stored in the cache memory 120

20   then becomes ready for the user's future search. The cache

memory 120 may be a disk type, semiconductor type and any

other types of memory.

The initial keywords extracted by the keyword extractor

108 are also sent to a cache search unit 112. The cache

25   search unit 112 searches in the cache memory 120 using the

keywords such as "meat" and reads a desired page, which is

already stored therein while instructing the search pre-
processor 110 or the search unit 130 to stop the global
search to the Internet. The page thus obtained is displayed
to the user via the recipe agent 506. When the desired page,
5 on the other hand, does not exist in the cache memory 120,
the global search through the search pre-processor 110 and/or
the search unit 130 is executed.

   The personal information DB 118 stores various
information regarding the user including eternal information
10 such as the preference of meals and hobbies, and temporal
information such as the recent meals the user had. The
personal information is generally acquired through the agent
processor 106 while the user is interacting with the user-
dedicated agent 502. In another embodiment, the apparatus
15 may comprise a schedule management function as a PIM or
personal information manager, a health management function to
calculate the calorie of the meals, and an accounting
function to record the prices of goods the user purchased.
The personal information may be obtained through such
20 functions.

   A preliminary search controller 114 specifies
information in which the user may be interested based on the
personal information stored in the personal information DB
118 and sends keywords concerning the specified information
25 to the search pre-processor 110. The search pre-processor
110, triggered by the keywords sent from the preliminary

search controller 114, generates the objective keywords and
the search condition, by which the search unit 130 starts the
search.   The search process initiated by the preliminary
search controller 114 may be preferably handled in a
5   background manner, for example, during nighttime when the
user does not use the apparatus or during the daytime when
the user does not input any instructions for a predetermined
period.   The process may be conducted when a mail program,
not shown, establishes the connection with the Internet to
10   download new e-mails.   In any case, as long as the search
process is handled in a background manner, the meta
information generator 116 can have sufficient time for the
processing.

Fig. 9 shows the internal structure of the meta
15   information generator 116.   The target page sent from the
search unit 130 is inputted to a keyword detector 350.   The
detector 350 detects keywords from the target page analyzing
the sentences and phrases contained in the target page.   The
detected keywords, which are hereinafter referred to as
20   "keywords for checking", are transmitted to a pre-check unit
352.

The pre-check unit 352 judges whether the target page
is really a page the user desires, based on the data stored
in a check data storage 362.   The storage 362 stores frequent
25   or important keywords for each segmented subject.   Similar to
a portal site, the subject may be first roughly classified

into "news", "computer", "travel", "gourmet", "auction",

"money", "sports", "entertainment", "music" and "job". The

"gourmet" may be subdivided to "restaurants", "events",

"pro's recipe" "ethnic dish", "cooking programs", "nutrition"

5   and "special information". The check data storage 362

obtains keywords by, for example, checking the pages of the

sites registered in the portal site according to each

subdivided subject.

    The pre-check unit 352 judges whether each of the

10 checking keywords belongs to the above-mentioned subjects or

subdivided subjects by matching the keywords for checking and

keywords stored in the check data storage 362. The target

page is judged to meet the user's purpose when many keywords

for checking belong to the subject "gourmet" and the initial

15 keywords "meat", "dish" and "recipe" which reflect the user's

intention belong to the same subject "gourmet". Instead of

the subject "gourmet", the subdivided subject "pro's recipe"

may be used. In that case, the target page may be judged to

be appropriate when 20% of the keyword for checking belong to

20 "pro's recipe". The major function of the pre-check unit 352

is not to conduct a rigid check, but to delete pages which

are apparently away from the user's intention. In this sense,

the judgment may be relaxed. The process result is sent to a

meta information write controller 360.

25   A subject analyzer 354, which is almost the same as the

pre-check unit 352, acquires the keywords for checking from

the keyword detector 350. The subject analyzer 354, however,
does not concern about the initial keywords and specifies a
subject or a subdivided subject to which most of the keywords
for checking belong. When "pro's recipe" is for example
5   specified, the subject analyzer 354 judges the theme of the
target page is "dish", especially "recipe", which is conveyed
to a meta information extractor 356 and a meta information
presumption unit 358.

       The meta information extractor 356 searches information
10 concerning "recipe" in the target page and generates a file
which is a collection of meta data, which is hereinafter
referred to as "meta information file". Fig. 10 illustrates
an example of the meta information file 370. In this file, a
template comprising items such as "classification" and "name
15 of dish", in which necessary information pieces detected in
the target page are embedded.

       The meta information presumption unit 358 presumes meta
information for the items in the meta information file 370
for which suitable information has not been detected in the
20 target page. For example, when "calorie" in Fig. 10 is left
unfilled, the presumption unit 358 may calculate the calorie
roughly referring to the items "material", "list of stuff"
and "component". The equation to calculate the calorie may
be recorded in the presumption unit 358 together with the
25 template. Besides the template for cooking, a template for
travel may be provided with the items "travel time", "travel

fees" and "the sights to see". Meta information may be picked up from digital maps, train schedule, travel guide of the area and so on which have been investigated beforehand when the information in the template for traveling is not found in the target page. When the user is interested in traveling, the preliminary search controller 114 may obtain information to presume meta information using maps and other various information available on the Internet. The pages containing the above-mentioned map information and so on may be stored in the cache memory 120 beforehand for future use from the user.

The meta information file 370 generated by the meta information extractor 356 and reinforced by the meta information presumption unit 358 is sent to the meta information write controller 360. The controller 360, after the approval by the pre-check unit 352, stores the meta information file 370 and the target page together in the cache memory 120.

Fig. 11 illustrates the association of the meta information file 370 and a page data 372 of the target page. The content of the meta information file 370 is embedded in the header or any other portion of the page data 372. The meta information file 370 and the page data 372 may be combined in a text file written in XML (Extensible Markup Language) as follows.

<URL>www.recipe.com</URL>

<classification>Chinese</classification>

</recipe meta information>.

Fig. 12 illustrates another combination of the meta
5   information file 370 and the page data 372. The meta

information file 370 and the page data 372 are generated

independently and a link information 374 is recorded. In

this configuration, the cache search unit 112 conducts search

on the meta information file 370 and desired data is read

10   from the cache memory 120 referring to the link information

374.

Fig. 13 illustrates the internal structure of the

search pre-processor 110. The initial keywords extracted by

the keyword extractor 108 are sent to a condition relaxing

15   unit 400. The condition relaxing unit 400 determines which

words to be deleted, referring to a reference table 404. The

reference table 404 records keywords which are too strict or

which reduce the number of hits too drastically. Such words

can be identified based on the past search record. Such

20   deleted keywords are hereinafter referred to as "invalid

keywords". The condition relaxing unit 400 sends to a

condition adding unit 402 and a search formula setting unit

406 the remaining keywords or selected initial keywords. The

invalid keywords are informed to the condition adding unit

25   402.

The condition adding unit 402 identifies the objective

keywords referring to the reference table 404 using the selected initial keywords and/or the invalid keywords and sends the objective keywords to the search formula setting unit 406. The selected initial keywords are logically ANDed

5   with the objective keywords and the result is then ANDed with the guide 524 sent from the guide presenting unit 512 in the search formula setting unit 406 to obtain the search condition which is sent to the search unit 130.

Fig. 14 illustrates the internal data of the reference

10   table 404. The reference table 404 comprises a keyword column 440, a deletion column 442 and an objective keyword column 444. The keyword column 440 records the initial keywords. The deletion column 442 shows the invalid keywords with a flag bit being "1". The selected keywords are shown

15   with the flag being "0". The objective keyword column 444 shows objective keywords corresponding to the initial keywords which are identified from the past search history or by an operator.

Fig. 15 shows the process flow of the middle processor

20   14. The user first inputs a search request "Let me know a recipe on meat" to the recipe agent 506. The request is acquired by the agent processor 106 (S10) and the initial keywords "meat", "dish" and "recipe" are extracted (S12). The initial keywords extracted are sent to the cache search

25   unit 112, which conducts search over the cache memory 120 (S14) and reads the desired page when it is cached (S14Y).

The page is read and displayed (S16).

When the desired page is not cached (S14N), the search
pre-processor 110 conducts the preprocess (S18) through
identifying the invalid keywords, endowing the objective
5   keywords and setting the search condition reflecting the
guide 524 sent from the guide presenting unit 512. The
search unit 130 searches the page on the Internet (S20).

The page found by the search or the target page is
displayed as if it were found by the recipe agent 506 obeying
10   the guide 524 from the user-dedicated agent 502 (S22). The
target page is sent to the meta information generator 116,
which conducts the pre-check, the analysis of the subject,
the extraction and presumption of the meta information. The
meta information is then generated as a file shown in Fig. 10
15   (S24). The meta information is associated with the target
page in the manner shown in Figs. 11 or 12 and is stored in
the cache memory 120 (S26).

According to the process flow, information necessary to
the user is generally promptly provided based on a search
20   request which is inputted by the user and which may be
subjective to some degree while the search process is being
shown to the user. The desired page can be appropriately
searched when it is in the cache memory 120 as the meta
information is added and cached. It is more probable,
25   according to the present embodiment, that the page read from
the cache memory 120 meets the user's intention. Caching

efficiency is generally high as the meta information
generator 116 pre-checks data to be cached.

Fig. 16 illustrates the flow of the pre-search
conducted by the preliminary search controller 114 as a
background process. The user records his/her daily meals in
the history column 532. The user likes Chinese food (S30).
The preliminary search controller 114 expects an inquiry from
the user concerning the Chinese recipe when it detects that
the user has not had Chinese food for one week, and generates
keywords such as "Chinese", "dish" and "recipe" (S32).

The preliminary search controller 114 judges the timing
for the background search has come when it becomes midnight
or the like (S34Y) and sends the generated keywords to the
search pre-processor 110. The process shifts to Fig. 15 via
the route "A". According to this embodiment, the apparatus
can be a highly customized agent machine to quickly respond
to the user.

The front processor 12, the middle processor 14 and the
back processor 20 have been described. Now the service
actually provided by the user-dedicated agent 502 and the
recipe agent 506 is described.

Fig. 17 illustrates the initial screen 600 on the PC
10 for the agent service. The user-dedicated agent 502
appears on the screen 600 and says, "Hello, let's chat!".
The user may input an instruction via voice. In Fig. 17,
however, an input region 602 appears on the screen 600. The

user inputs "Recommend a recipe" in the input region 602.
The request is obtained by the request input unit 510 and is
processed in the aforementioned manner.

A new scene is created by the agent introduction unit
5 516 where the user-dedicated agent 502 introduces the recipe
agent 506 to the user. Fig. 18 shows the scene. The user-
dedicated agent 502 says "OK, I call Recipe Agent". The
recipe agent 506 appears and says "Trust me". The user-
dedicated agent 502 then utters a guide 524 special to the
10 user referring to the acquired request 518. In this example,
the user is suffering from anemia and the user-dedicated
agent 502 says "Recommend a recipe good for anemia".

Fig. 19 illustrates the screen 600 when the recipe
agent 506 got the search result based on the guide 524. The
15 recipe agent 506 says "I found" and several titles of the
recommended recipes are displayed in a search result region
604 as "today's recipe". The user-dedicated agent 502,
detecting that the user has had Chinese food consecutively,
gives a new guide 524 saying "Avoid Chinese recipe today".
20 By this time, the middle processor 14 or the back processor
20 may have started a background process for the search
avoiding Chinese food. In this case, however, the user
inputs in the input region 602 "I prefer Chinese".

Fig. 20 illustrates the screen 600 after the secondary
25 search based on the guide 524 is finished. The instruction
inputted by the user has higher priority than the guide 524

from the user-dedicated agent 502 and the search is limited

for the Chinese food. In this secondary search, the

condition regarding the anemia and other conditions may be

reflected. After the secondary search, the recipe agent 506

5   says "Here is a Chinese recommendation". The recommendation

is displayed on the search result region 604. The user-

dedicated agent 502 says "Click here for more information".

The user can click the titles of the recipes to directly

access to the related sites.

10   In this example, the user requests a Chinese recipe

even after he/she has had Chinese dishes consecutively

recently. After a series of search process is finished, the

user-dedicated agent 502 may ask the user "You have had

Chinese food for three days. Are you really OK?". If the

15 user answers "Yes", the search condition concerning the

frequency of the same kind of food may be relaxed for the

user.

Fig. 21 illustrates the flow of the service provided by

the agents. The user initiates the initial screen shown in

20 Fig. 17 (S50). When the user inputs a request for service in

the input area 602 via a keyboard or voice (S52Y), the user-

dedicated agent 502 calls and introduces an expert agent

suitable for the service (S54). The expert agent conducts

the initial search based on the request (S56) and displays

25 the search result. The guide 524 is injected to the search

(S58) and the secondary search is initiated (S60) to more

properly find suitable information, which is displayed. The
user can input an instruction at any time during the above
steps to modify the service. The guide 524 may be injected
when the initial search (S56) is started, to conduct the
5   secondary search (S60) from the beginning. If there are
still too many hits in the secondary search, a new guide 524
may be inputted or the user-dedicated agent 502 may ask a few
more questions to the user to finally reach the necessary
information.

10   The number of times the user initiated the agent screen
may be recorded in the user information DB 150 of the back
processor 20. The user-dedicated agent 502 is programmed to
passively listen to the user's request until the number
reaches a predetermined value. The user-dedicated agent 502
15   may ask questions more actively on the personal information
of the user after the number reaches the predetermined value
on the assumption that the user may allow such questions.
The user-dedicated agent 502 may, for example, ask "Where do
you like to go?", "How old are you?" and the like and the
20   answers to the questions may be stored in the user
information DB 150 of the back processor 20 or the personal
information DB 118 of the middle processor 14.

Although Embodiment 1 has been explained with examples,
it should be understood that many changes and substitutions
25   may be made by those skilled in the art within the spirit and
the scope of the present Embodiment. A few such changes are

now described.

The apparatus according Embodiment 1 may be provided with functions for amusement. For example, the user can get points when he/she makes access to the user-dedicated agent 502 or other expert agents. The managing entity of the web server 18 may award a prize to the user when the point reaches a certain value so that the user is encouraged to use the web site, which may become more valuable in terms of advertisement.

"A premium agent" or a special expert agent may be secretly implemented in the apparatus to encourage the user to find the premium agent for amusement or for a present awarded by the site manager.

Expert agents may be local agents. A FAQ expert agent or a mail expert agent may be implemented in the apparatus to help the user operate the apparatus. Local agents are advantageous in that they can work in an off-line environment.

Each expert agent may have a function to record the dialog it had with each user in the user information DB 150 and a function to classify the user to which it is now serving to a specific user type referring to the dialog recorded in the user information DB 150. Expert agents generally can more properly respond to the user after the user is classified into a specific user type.

In another embodiment, the user-dedicated agent 502 may have a function to record user requests in the user

information DB 150 and the back processor 20 may have a

function to search other users who have similar preference,

behavior, life style and the like with the present user based

on the past requests stored in the user information DB 150.

5   The search unit 130 may push the same page to the meta

information generator 116 of such users.

Embodiment 2

        Designing virtual agents is difficult although users do

10   not know the effort of agent designers. Users expect the

agents to understand their request properly and to act

immediately. It is however difficult to presume all the

various user requests and is still more difficult to predict

how the users express their request in words, phrases and

15   sentences. Analysis of the request is a hard task.

        The present embodiment aims to realize agents which can

flexibly respond to various requests from the users. Another

purpose of the present embodiment is to provide a user

support apparatus to more precisely understand the request of

20   the users. Still another purpose of the present embodiment

is to provide a user support apparatus which can improve the

preciseness of the understanding of the user requests.

        Fig. 22 is a block diagram of a user support system

1010 according to the present embodiment.

25   The entire configuration can be realized as a stand

alone apparatus. In another embodiment, a back end server

may comprise arbitrary portions of the apparatus such as an
agent controller 1012, a request analyzer 1014, a response
controller 1016, a dialog data storage 1018, a log storage
1020, a search unit 1024 and an agent data storage 1034.

5   When the server is provided with a few functional blocks, the
remaining functional blocks are implemented in the user
apparatus which is a client machine. It is noted that there
are many variations how to assign the functional blocks
between the server and the client. Now the user support

10   system 1010 is described assuming that it has all the
functional blocks shown in Fig. 1 so that it can operate as a
basic agent machine even in an off-line environment.

        The agent controller 1012 comprises an agent output
unit 1030 to display agents to a user and a request input

15   unit 1032 to obtain the requests given from the user to the
agents. An agent data storage 1034 holds image data to
display agents.

        The request analyzer 1014 performs voice recognition on
the request uttered by the user and transforms the voice into

20   the corresponding sentence. The request analyzer 1014 then
divides the sentence into independent words. For example,
when the user utters "Good morning", the request analyzer
1014 divides the sentence into "Good" and "morning".

        The words thus obtained are sent to a response

25   controller 1016, which determines the response of an agent
referring the keywords "Good" and "morning" to a dialog data

storage 1018. The dialog data storage 1018 stores
conversation data the agent should utter for each major
keyword. The response controller 1016, for example, selects
"Good morning. How are you?" as the response from the dialog
5   data storage 1018 to answer. The response is sent to an
agent output unit 1030, which conveys "Good morning. How are
you?" by the action, voice of the agent or by a sentence.

When the user request such as "Tell me the weather
tomorrow" makes it necessary to search for a specific
10   information, the response controller 1016 transfers the
keywords such as "tomorrow" and "weather" to a search unit
1024, which acquires weather forecast via the Internet 1040.
At the same time a fixed sentence "It will be…tomorrow" is
read from the dialog data storage 1018, which is sent to the
15   agent output unit 1030 together with the information obtained
via the Internet 1040. The agent output unit 1030 may utter
"It will be cloudy tomorrow" to the user.

The response controller 1016 cannot always understand
the user request. The response controller 1016 may not be
20   able to find a suitable conversation data in the dialog data
storage 1018 when the user inputted an unexpected request.
In such a case, the response controller 1016 records the
request as an unattained request in a log storage 1020 and
reads a formatted apology "I'm sorry, I cannot understand
25   well" from the dialog data storage 1018 to thereby send it to
the agent output unit 1030 as an error handling process. The

agent output unit 1030 utters the apology to the user. The

minimum information the log storage 1020 should record is the

unattained request. In Figs. 9 and 10 described later, all

the interaction between the user and the apparatus is

5   recorded in the log storage 1020 as the history of the

interaction is sometimes useful in reality.

A communication unit 1022 reads the unattained requests

from the log storage 1020 and sends them to an arbitrary

manager, not shown, via the Internet using an electric mail

10   periodically or when an unattained request occurs or when the

number of the unattained requests reaches a predetermined

value. The system manager may reside within the same site as

the user support system 1010. The manager registers each

unattained request and its corresponding response to the

15   dialog data storage 1018 to thereby improve the function or

performance of the agents.

Fig. 23 illustrates the flow of service performed by an

agent in the user support system 1010. When the user support

system 1010 is powered on, the agent output unit 1030 outputs

20   an agent to the user (S1010). The request input unit 1032

waits for a user request (S1012). When a request is inputted

(S1012Y), the request analyzer 1014 decomposes the request

into words (S1014). The words are transmitted to the

response controller 1016, which judges whether the service is

25   possible or not (S1016). The service is judged to be

possible when a suitable conversation data is found in the

dialog data storage 1018 (S1016Y). Necessary information for
the service is acquired from the dialog data storage 1018 and,
if necessary, by the search unit 1024 (S1018). The service
is performed via the agent output unit 1030 (S1020).

5   On the other hand, when the response controller 1016
judges the service not to be possible or when it cannot
understand the user's request (S1016Y), it reads a formatted
apology from the dialog data storage 1018 to make the agent
output unit 1030 utter the apology (S1022) and records the
10 request as an unattained request to the log storage 1020
(S1024). The communication unit 1022 transmits the
unattained requests to the system manager (S1026).

        Figs. 24 to 29 show an example of the interruption
between the user and an agent. In Fig. 24, Electricity Agent
15 1062 which is in charge of services regarding electricity
related matters appears on the screen 1060 and accepts user
questions as to electric appliances. The user inputs a
request such as a question in an area 1064. The user inputs
"Something's wrong with my mobile phone".

20   Electricity Agent 1062 answers "OK, tell me concretely"
as shown in Fig. 25. The user inputs "Battery is not
charged". The first check point for this problem is read
from the dialog data storage 1018 and Electricity Agent 1062
asks "Is the battery pack correctly attached?" as shown in
25 Fig. 26. The user answers "Yes" to this question. Then the
next check point is confirmed. In this example therefore the

function of Electricity Agent 1062 is an embodiment of so-
called FAQ for electric appliances.

Fig. 27 shows the response of Electricity Agent 1062
when it could not understand the request. In this case, the
5   user wants to know his/her electric devices can operate in
Africa before the trip and asks "Let me know the standard
voltage in Africa". Electricity Agent 1062 is, however, not
designed to cope with such a question and cannot find a
suitable answer in the dialog data storage 1018. The user
10 request is recorded as an unattained request in the log
storage 1020. Electricity Agent 1062 answers "... I am very
sorry! Please contact our staff at 03-xxxx-xxxx" to hand over
the question to a human operator. The system manager,
viewing the unattained request, can implement the voltage
15 information in each country in the dialog data storage 1018
to thereby continuously improve the FAQ.

Fig. 28 shows a scene for information search. Cooking
Agent 1066 for providing information regarding cooking
especially recipe to the user appears on the screen. The
20 user inputs a request "Recommend a Chinese recipe". Cooking
Agent 1066 searches for recommendation through the search
unit 1024 and displays the recommended items in a search
result area 1068. The user can click the items displayed in
the area 1068 to acquire more information via the Internet
25 1040. In this situation, if the user inputs a question "Let
me know a typical recipe in the ancient Rome", this request

will probably be recorded as an unattained request. The
manager can review the information regarding recipe from
various views and can improve the content of the dialog data
storage 1018.

5   Fig. 30 shows the internal structure of the log storage
1020. The log storage 1020 records all the conversation
session 1080 between the user and the agent. In Fig. 30,
conversation sessions 1080 for "userABC" and "userDEF" are
shown. When the user support system 1010 is a standalone
10   type, it can create a history of multiple users by admitting
login of the users. When the log storage 1020 is implemented
in the back end web server, it can record a history of
multiple users of multiple user support systems 1010.

The conversation session 1080 further comprises a
15   dialog record column 1090 and an unattained flag column 1092.
In the former column, "u" and "a" stand for the utterance of
the user and the agent, respectively. In the latter column,
the flag is set to one when the request is an unattained and
is set zero otherwise.

20   Fig. 31 illustrates an unattained request list 1100
generated by the communication unit 1022. The list 1100
comprises a user column 1102 to record the names of users who
inputted unattained requests, a mail address column 1104, a
date and time column 1106 to record when the unattained
25   request occurred, and a full sentence column 1108 to store
the entire sentences of the unattained requests. The system

manager, after checking the unattained requests, may answer
to the users with electronic mails.

Embodiment 2 is described. Embodiment 2 also has
various modifications.

5   In one embodiment, the response controller 1016 may
check the full sentence of the user's request directly
against the dialog data storage 1018. In this case,
unattained requests may be registered as a whole sentence
such as "Let me know the standard voltage in Africa" together
10   with the suitable response for the request.

Embodiment 3

Embodiment 3 aims to provide a technique to realize
interaction among a plurality of agents or characters from a
15   different technical view. According to Embodiment 3,
characters which have been created entirely independently can
have interaction. This embodiment also provides a technique
to efficiently develop such agent functions.

Fig. 32 shows the entire configuration of the user
20   support system 2010 according to Embodiment 3. A user
terminal 2012, a control window management site 2016, a chat
server 2018 and a recipe server 2020 are connected via the
Internet 2014. The control window management site 2016, the
chat server 2018 and the recipe server 2020 are servers in a
25   broad sense of the word.

The chat server 2018 and the recipe server 2020 are in

charge of respective specialized areas so that they interpret user utterance and process the actions of agents. The chat server 2018, for example, processes greetings such as "Hello", whereas the recipe server 2020 processes utterance

5   concerning recipe such as "Let me know a good recipe". By assigning specialized functions to each specialized server, the whole process can be divided and distributed so that the maintenance of each agent becomes easier.

        The chat server 2018, the recipe server 2020 and the

10 like are collectively referred to as "specialized" servers or "expert" servers and the agents put in the specialized servers are referred to as "expert" agents. The control window management site 2016, the chat server 2018 and the recipe server 2020 may be realized in different nodes on the

15 network. Alternately, the control window management site 2016 may be implemented in the chat server 2018, which may be designed as the originating server to handle the interaction with the user terminal 2012. The example below is described on the latter assumption.

20   The basic process in Fig. 32 is as follows. The user terminal 2012 first connects to the control window management site 2016. The site 2016 comprises a total management function to manage a plurality of agents, and a character management function to manage a plurality of characters

25 simultaneously. These functions are referred to as "horizontal functions" hereinafter. The horizontal functions,

which are characteristic of the present embodiment, work as a
bridge to allow different agents to interact having
conversation. The site 2016 transmits a program to realize
the horizontal functions to the user terminal 2012, which
5 then enjoys the horizontal function even in an off-line
environment.

The user terminal 2012 then connects to the chat server
2018 to receive a specific service. The chat server 2018 is
specialized for chat and comprises an agent control function
10 to realize the chat service and a character control function
to work for the same purpose. These specialized functions
are referred to as "expert functions" or "specific purpose
functions". The specific purpose functions are designed to
and implemented in each expert server. The recipe server
15 2020 has the specific purpose functions regarding recipe.
Specialized servers may be provided for a travel agent, a PC
agent and the like in which users may be interested.

The user first talks to the chat agent to request an
arbitrary service. The chat agent acquires and interprets
20 the user utterance. When the utterance relates to recipe,
the chat agent calls the total management function to make
the recipe agent appear on the screen. The total management
function divides the screen of the user terminal 2012 into
two frames in which the chat agent and the recipe agent are
25 put separately. The two agents have interaction including
greetings and the like. For this purpose, the horizontal

function is called. The interface between the horizontal
function and specific functions is predefined. It becomes
possible for each agent to talk to another agent as log as
the agent is designed on the interface. The interaction with
5   another agent is not possible without the horizontal function.
The agent must respond to another agent when it is talked to.
To this end, functions according to the interface must be
implemented in the agent so as to take actions responsive to
the total management function. The agents can be put in
10 windows instead of the frames throughout this specification.

Various functions so far described are realized in the
form of program functions. For this purpose, the main
developer of the entire user support system 2010 or the
"leading developer" first implements the horizontal function
15 in the control window management site 2016 as the basic
framework of the entire system, and informs designers of
expert agents or "general developers" of the horizontal
function. The general developers can know the horizontal
function which they can use, and the format and content of
20 each function. The leading developer, on the other hand,
decides the content of program functions to realize specific
functions of each agent so that the horizontal function can
issue instructions to each agent. The general functions must
implement the program functions informed by the leading
25 developer. The "interface" may be regarded as the whole
specification regarding the program functions described above.

Fig. 33 illustrates the internal structure of the control window management site 2016. The control window management site 2016 comprises a total system manager 2022, a character manager 2024, and a user dialog processor 2026,

5   each of which communicates with the user terminal 2012 via a communication unit 2028 and the Internet 2014. The total system manager 2022 realizes the horizontal function at the agent level. Similarly, the character manager 2024 realizes the horizontal function at the character level. The user

10 dialog processor 2026 displays a user input prompt on the screen of the user terminal 2012 and acquires letters inputted by the user. The functions of the control window management site 2016 may be downloaded to the user terminal 2012 beforehand and may work inside the user terminal 2012.

15 The total system manager 2022 provides a field to realize the interaction among a plurality of agents and manages the agents totally. The substance of the total system manager 2022 in this embodiment is an HTML file, in which program functions described in a script language

20 include the following ones.

AddAgent(): add a new character to the field,

Bcast(): inform all the characters displayed of an information item,

Tell(): inform one agent of an information item,

25 ReqUI(): request the chat agent to acquire user information,

ReqPr(): request the user input prompt to be displayed.

In these functions, attributes such as target information and target agent may be described. These functions are provided as standard functions, which the general developers can use when designing an agent. The total system manager 2022 also manages Cookies to be set in the browser of the user terminal 2012.

The character manager 2024 provides a basic function to visually express the interaction among the agents at the character level. The character manager 2024 is also an HTML file in which functions are written in a script language. Some examples of the functions are as follows.

WalkClose(): move to a specified character,

PointWin(): point at a specified window,

Talk(): talk to a specified character.

These functions are also provided as standard functions. To realize these functions, the character manager 2024 has a function to detect the positions of all the characters.

Fig. 34 shows the internal structure of the chat server 2018. In this figure, "H", "I", "F" and X" stand for utterance data, index search for utterance, a file name containing the URL of the page of the expert server which should respond to a specified user utterance, and unidentified utterance, respectively.

An agent controller 2066 obtains and interprets a user request via a character so that the substantial function of

an agent is realized. A character controller 2068 provides a
series of basic functions of a character used by the agent
controller 2066. At least one set of the agent controller
2066 and character controller 2068 is implemented in each
5   specialized server to conduct a specialized service. A
communication unit 2030 enables communication between the
agent controller 2066 and the character controller 2068 with
the user terminal 2012 via the Internet 2014.

        The agent controller 2066 has a series of functions to
10 respond to the utterance of the user or other agents, which
are hereinafter referred to simply as "target utterance". A
main controller 2060 controls a series of processes mainly
conducted by an utterance acquiring unit 2032 and the
character controller 2068. The essential function of the
15 main controller 2060 is to specify a page which should
respond to each target utterance and moves to the page. The
utterance acquiring unit 2032 acquires the target utterance
from the user terminal 2012 and sends it to an utterance
search unit 2034. The utterance search unit 2034 first
20 conducts an index search by verifying the first letter or
word of the target utterance in an index file 2036. After
the index search, the utterance search unit 2034 specifies
the target utterance by conducting a phrase search
considering the entire target utterance. In the phrase
25 search, not only the words but also the order of the words
are considered. When the target utterance cannot be found by

the phrase search, the utterance may be divided into words
and keyword search may be conducted.

The index file 2036 contains in an alphabetic order
assumed or anticipated utterances which are stored in an
5   assumed utterance collection 2038 to specify the target
utterance. It is generally possible to conduct a fast search
by referring the first letter or word to the index file 2036
even when the assumed utterance collection 2038 is large. As
described later, in this embodiment, the assumed utterance
10 collection 2038 is easily expanded and the fast search
realized by the index search is beneficial.

When the target utterance is specified in the index
file 2036, a file containing the URL and the like of the
specialized server to respond to the target utterance is
15 specified in the index file 2036. The file stored in the
assumed utterance collection 2038 is then opened and the URL
is acquired. Each target utterance has one file in the
assumed utterance collection 2038.

When the URL is within the chat server 2018 itself, the
20 URL is transmitted to the main controller 2060, which sends
the URL to the browser of the user terminal 2012 via the
communication unit 2030.

When the URL is within another specialized server, the
URL is set to the browser of the user terminal 2012 and the
25 user terminal 2012 accesses the specialized server. To be
more precise, the URL points not the home page of the

specialized server but a specific independent page to
directly respond to the target utterance. Each utterance has
at least one corresponding page in this embodiment.

It is naturally desirable that the target utterance has
its complete copy in the assumed utterance collection 2038.
During the improving process of the assumed utterance
collection 2038, however, the target utterance does not
necessarily have its perfect copy in the assumed utterance
collection 2038. In that case, the utterance search unit
2034 seeks the most probable utterance in the assumed
utterance collection 2038 decomposing the utterance into
words and retrying search inputting logical AND of the words
especially nouns. The target utterance which could not be
found or which was found only in the retry search is recorded
in an unidentified utterance file 2040 as an unidentified
utterance, which is transmitted to the system manager by an
e-mail via the reporting unit 2042.

The system manager requests the manager of the
specialized server which should have responded to the
unidentified utterance to improve the response process
conducted by the expert agent. The manager of the
specialized server registers the unidentified utterance and
the URL of a page of the specialized server which should
respond to the unidentified utterance, in the assumed
utterance collection 2038 within the specialized server,
registers the index of the utterance in the index file 2036,

and designs the process including the action of the expert
agent realized with the page. In this maintenance, an
unidentified utterance can be easily added in the assumed
utterance collection 2038 and it is generally easy to improve
5   the content of the assumed utterance collection 2038.

The main controller 2060 also manages a personal
information file 2048. The personal information file 2048
may be managed only by the chat server 2018 among a plurarity
of specialized servers as the chat server 2018 frequently has
10   conversation with the user and is suitable to acquire the
personal information of the user. The main controller 2060,
for example, may be implemented with a program function to
periodically ask the user information, such as the age of the
user and other attributes and the preference on foodstuff and
15   the like. Answers from the user may be recorded in the
personal information file 2048. Other agents can request to
acquire the personal information using the aforementioned
program function ReqUI(). The personal information may be
used when specialized servers perform services to the user.
20   In this embodiment, the chat agent may issue an instruction
instead of the user when another agent conducts a service to
the user. Agents interact during the process.

The main controller 2060 may be implemented with the
program functions below.

25   Respond(): is called when a character is clicked and
describes a proper process to the click,

Listen(): acquires information when transmitted from another agent.

Implementation of these functions is entrusted to the general developer of the chat server 2018. These functions

5 are called from the total system manager 2022, the character manager 2024 and the like.

A character controller 2068 comprises an action file 2062 to describe the actions of a character to respond to each target utterance, and a character data 2064 to store the

10 image data and voice data of the character. The character data 2064 is first downloaded to the user terminal 2012 and can work within the user terminal 2012.

The character controller 2068 is, for example, implemented with the below program functions.

15 ComeOut(): makes characters appear on the screen,

Act(): makes a character play a designated action,

Spk(): displays a designated text in a window and outputs voice data according to the text,

GoOut(): makes a character disappear on the screen,

20 Halt(): Freezes all the characters.

The basic action of a character is realized with the above functions. The development of these functions is also entrusted to the general developers. These functions are also called from the total system manager 2022 and the

25 character manager 2024.

An access recorder 2044 records the access history of

each user to the specialized servers in an access information
file 2046. By this configuration, a response to the same
user utterance may be made different to each user. For
example, when a user first visits the chat server 2018 and
5   says "Hello", the chat agent answers "Hello. Nice to meet
you". When the user revisits the chat server 2018, the chat
agent may answer "Hello, how are you getting along?" to act
more properly according to the situation. The access
recorder 2044 informs the utterance search unit 2034 of the
10 access history of the user. The utterance search unit 2034
selects a page suitable for the present situation and sends
the URL to the browser of the user terminal 2012 when it
found a plurality of pages of a specialized server to respond
to the target utterance in the assumed utterance collection
15 2038 just like the above example.

Fig. 35 shows the internal structure of the index file
2036. Fig. 36 shows the internal structure of the assumed
utterance collection 2038. The index file 2036 comprises an
alphabetic column 2100, a target utterance column 2102 and a
20 file name column 2104. The target utterances are sorted in
the alphabetic order noting the first letter of the utterance.

The assumed utterance collection 2038 comprises a file
name column 2104, a target utterance column 2102 and a page
column 2120 to indicate the page of the specialized server to
25 respond to the target utterance. For example, when the user
utterance is "Hi", the page of the specialized server is

"URLa43". The combination of "Hi" and "URLa43" composes the
file f044. The target utterances are classified to each
specialized server. A user utterance collection 2110 of
which the chat server 2018 should take care and a user
5   utterance collection 2112 of which the recipe server 2020
should take care, for example, are generated independently.
The index file 2036 and the assumed utterance collection 2038
are linked together with file names. "Hello" corresponds to
the file f045 in the index file 2036, which in turn
10 corresponds to the file f045 of the assumed utterance
collection 2038.

        As shown in the index file 2036, "Hello" has two
corresponding pages URLa1 and URLa2. The URLa1 is sent to
users who first visit the chat server 2018 and URLa2 is sent
15 to users who revisit the chat server 2018.

        Fig. 37 shows the access information file 2046. "User
1" has visited "chat", "recipe" and "auction" servers. "User
2" has visited "travel" and "PC" servers. In this situation,
when the user 2 visits the chat server 2018, the chat agent
20 selects an utterance for the first visitor, and when user 1
visits the chat server 2018, the chat agent selects an
utterance for a revisitor.

        Fig. 38 shows the internal structure of the action file
2062. URL specified in the utterance search unit 2034, such
25 as the URLa1 or URLa2 in case of "Hello" shown in Fig. 36, is
inputted to the action file 2062 via the main controller 2060.

In the action file 2062, each URL specified at the utterance
search unit 2034 is corresponded to each page, for example,
URLa1 to page 70, URLa2 to page 72 and URLan to page 74 so
that multiple pages are bundled. Each page is a Web page and
5   is provided for each target utterance to achieve system
flexibility.

     The content of a page contained in the action file 2062
is now described. The name of a page is "AC.html" and has a
function to load and display a standard character provided by
10 a certain OS under the name of "AChara". The character
speaks when the function Spk is called from outside.

```
<html>

<head>

<title>TEST</title>

<meta http-equiv="Content-Type" content="text/html;

charset=Shift_JIS">

</head>

<body bgcolor="#FFFFFF">

<!--declaration and load of Agent of company x-->

<OBJECT ID="AgentControl" CLASSID="xxx" CODEBASE="#VERSION=

2,0,0,0">

</OBJECT>

<SCRIPT language=Javascript>

var AChara;

Agent.Characters.Load("AChara","C:¥¥XXX¥¥agent¥¥CHARS¥¥AChar

a.acs");
```

```
AChara=Agent.Characters.Character("AChara");

AChara.ComeOut();

</SCRIPT>

<SCRIPT language=Javascript SRC="AC.js"></SCRIPT>
```

5   `</body>`

`</html>`

A script file is used. The character speaks using the
function, which collectively stands for HTML files and
functions written in script languages. The script file is as
10   follows.

```
function SPK(spText) {

        AChara.Speach(spText);

        }
```

When the name of a frame in which AC.html is displayed
15   is "aFrame", it becomes possible to make AChara speak from
outside by writing as follows.

`aFrame.Spk("Good-bye");`

Fig. 39.illustrates the internal blocks of the user
terminal 2012. Each function of the user terminal 2012 may
20   be provided from the control window management site 2016, the
chat server 2018, the recipe server 2020 and other expert
servers, may be pre-installed in the user terminal 2012 or
may be downloaded from the control window management site
2016 when the user terminal 2012 is first connected to the
25   site 2016 and is held locally. In other words, when the user
support system 2010 is realized with the user terminal 2012,

the site 2016 and other servers, each function for process
may be installed in the client or in the server or in any
other locations. As a general rule, functions which should
be less frequently updated or which need no updating may be
5   pre-installed in the client.

        A communication unit 2114 communicates with the control
window management site 2016 and the like via the Internet
2014. A control window 2080 comprises a first processor
2082, a second processor 2084 and a user dialog processor
10 2086. The first processor 2082 comprises a total system
manager 2090, which manages a chat agent controller 2092 and
a recipe agent controller 2094. The total system manager
2090, the chat agent controller 2092 and the recipe agent
controller 2094 correspond to the total system manager 2022
15 of the control window management site 2016, the agent
controller 2066 of the chat server 2018 and an agent
controller (not shown) of the recipe server 2020,
respectively. The chat agent controller 2092 and the recipe
agent controller 2094 manage a chat region generator 2106 and
20 a recipe region generator 2108 to display the result of
services, respectively. The second processor 2084 comprises
a character manager 2096, which manages a chat character
controller 2098 and a recipe character controller 2116. The
character manager 2096, the chat character controller 2098
25 and the recipe character controller 2116 correspond to the
character manager 2024 of the control window management site

2016, the character controller 2068 of the chat server 2018
and a character controller (not shown) of the recipe server
2020, respectively. The user dialog processor 2086
corresponds to the user dialog processor 2026 of the control
5   window management site 2016. The first processor 2082 and
the second processor 2084 refer to the information inputted
in the user dialog processor 2086.

The above functions, which have been described with
regard to Figs.33 and 34, can be viewed from the user. The
10   chat region generator 2106 and the recipe region generator
2108 display information to the user and accept instructions
and other operations from the user. The second processor
2084 provides information in a visible or audible manner and
accepts user operations such as clicks. The user dialog
15   processor 2086 displays a user input prompt and accepts
character input.

Now the interaction between the user and agents and
among agents is described. Fig. 40 illustrates a screen 2150
displayed when the user initiates the user terminal 2012. A
20   character 2156 of the chat agent, which is hereinafter
referred to as "Chat Agent" 2156, appears and speaks "Hello!
I am Chat Agent Pea-ko". The user inputs "Let me know a
recipe" in an input region 2154 and clicks a SEND button.
The input area 2154 may appear when the user clicks Chat
25   Agent 2156. Chat Agent 2156 may talk to itself or ask a
question to the user to encourage the user request until the

user clicks it.

Inputted "Hello" is acquired by the user dialog
processor 2086 and is analyzed by the chat agent controller
2092. The chat agent controller 2092 has inside a copy of
5   the function of the agent controller 2066 in the chat server
2018 and specifies a page in the action file 2062 of the
character controller 2068 to respond to the user. The page
may be identified in the action file 2062 of the character
controller 2068 or in the chat character controller 2098 of
10   the user terminal 2012. In this example, the target
utterance relates to recipe and a process "Call a recipe
agent on the screen" is described in the specified page for
the response. More concretely, a program function ADDAgent()
prepared by the total system manager 2022 is written in the
15   HTML file beforehand. That is, a horizontal function at the
agent level is used to bridge different agents when the
process executed by an agent relates to another agent.

Fig. 41 shows a screen 2150 appearing after the above
process. The total system manager 2090 divides the screen
20   2150 into a first frame 2150a and a second frame 2150b. Chat
Agent 2156 is placed in the former and Recipe Agent 2160 is
placed in the latter. Before Recipe Agent 2160 is called,
Chat Agent 2156 says "Now, let's call Recipe Agent…" to the
user. Recipe Agent 2160 on the other hand asks "I am Recipe
25   Agent. What is your preference?" to the user when it is
called. The utterance of Chat Agent 2160 is realized by the

recipe agent controller 2094 and the recipe character
controller 2116 using a program function such as Spk() to
make a character speak written in a page (not shown) to
respond to the user. The user then inputs "Chinese" in the
5   input region 2154 and sends it to the server.

Fig. 42 shows the screen 2150 after the above process.
Chat Agent 2156 interprets that the utterance of Recipe Agent
2160 relates to the introduction of a dish. The chat
character controller 2098 specifies a page to respond to the
10 utterance. In the page, the note "Advise the agent presently
speaking not to recommend hot dishes" is described. Chat
Agent 2156 comes closer to Recipe Agent 2160 and talks "Do
not teach very hot ones" as a request. For this purpose,
aforementioned WalkClose()and Talk() are written in the page
15 of Chat Agent 2156. Recipe Agent 2160 on the other hand
accepts the advice as "utterance of another agent",
interprets the utterance and specifies a page to respond. In
the page, for example, the note "Obey the request. Search for
a recipe without chili sauce" is written. In this case also,
20 the function Talk() is used to make Recipe Agent 2160 and
Chat Agent 2156 face each other. In the background process,
the chat agent controller 2092 executes search using a search
condition or a firmula such as

("recipe" OR "menu") AND "Chinese" AND "recommendation" AND
25 /"chili sauce",

where "/" is a NOT operator. The preference of the user is

recorded beforehand in the personal information file 2048.

Fig. 43 shows the screen 2150 containing the search
result by Recipe Agent 2160. Recipe Agent 2160 says "Today's
recommendation". The search result is displayed in a recipe
5   window 2166 generated by the recipe region generator 2108.
The search result is displayed with titles which are linked
to details. Sites containing Chinese recipe found by the
search are displayed in a search result area 2172 by the
recipe agent controller 2094 for the reference. Chat Agent
10   is asleep as it has not been talked to. Pages may be
designed to respond not only to the content of the target
utterance but also to the interval or other states of the
utterance.

In Fig. 43, the user further inputs a question "Tell me
15   good places for autumn hiking". Fig. 44 shows the screen
2150 appearing after the question is inputted. In the screen,
a third frame 2150c is created and Travel Agent 2170 appears
in the frame. Chat Agent 2156 talks to Travel Agent 2170
"Hello. Long time no see you." and Travel Agent 2170 answers
20   "Hi". The interaction between different agents here is also
realized by the aforementioned program functions or the like.

The effect of the present embodiment is as follows.

Different agents provided from different companies or
creators can have interaction by standardizing the interface
25   at a program function level. Agents which have completely
different output formats such as a 3D polygonal character

written in VRML (Virtual Reality Modeling Language), a 2D

character in JPEG (Joint Photographic Expert Group) and an

arbitrary bit map character the user created with a digital

camera can have conversation on the same screen and thereby

5   can provide an exquisite agent apparatus.

By adopting a standardized interface, the leading

developer can effectively collaborate with general developers

or the third parties. The leading developer develops the

control window management site 2016 and the general

10   developers develop expert agents. The number of expert

agents can be increased relatively easily in accordance with

the user request by designing each agent in a modular manner.

A few modifications are now described. The user

terminal 2012 may be pre-installed with a plurality of expert

15   agents which are frequently used. The user terminal 2012 may

download such agents beforehand. In that case, if an agent

which should be called after the interpretation of the

utterance by Chat Agent 2156 exists inside the user terminal

2012 from the beginning, the process by Chat Agent 2156 is

20   made unnecessary and the expert agent may appear immediately

on the screen 2150 without the help of Chat Agent 2156. Such

expert agents may be hidden in the user terminal 2012 even

when they exist therein.

The control window 2080 may be a conceptual framework

25   provided by the control window management site 2016. In

actual implementation, however, the control window 2080 may

be provided visibly or invisibly, linked with an arbitrary
object or a region on the screen 2150. The control window
2080 may be set on the entire screen 2150 in an invisible
manner so that Chat Agent 2156 appears when the user clicks
5   on an arbitrary portion of the screen 2150.

The target utterance may be acquired via voice
recognition. Users may feel it more natural to input their
request via voice.

An unidentified utterance is described as an utterance
10 which could not be specified in the assumed utterance
collection 2038. The unidentified utterance, however, may be
one which could be specified in the assumed utterance
collection 2038 but to which the expert agent could not
properly respond. For example, when the target utterance is
15 "Let me know a recipe", the search result may contain to many
information items. In this case, the user eventually cannot
find desired information. Such a target utterance may be
sent to an expert agent manager so that the expert agent is
improved.

20 Utterance from an expert agent has been selected based
on the access history of the user to each expert server. The
utterance may be further selected based on the attribute
information of the user. The expert agent may select a more
gentle expression when the user is a female. The agent may
25 select a more formal or polite expression when the user is
relatively old.

It is not always necessary for expert agents to interpret the user utterance using the full sentence search. A "beef" expert agent may be designed such that it always responds to the word "beef" or "meat" regardless of the whole

5 sentence. Each expert agent may be implemented with a different method for interpreting the user utterance. A single expert agent may have more than one method to interpret the user utterance.

The character manager 2096 of the second processor 2084

10 may be combined with the total system manager 2090 of the first processor 2082. There may be various modifications to achieve the same functions. Combining or dividing the functional blocks depends on the design guide and the actual operation.

15 An action of a character such as "Speak" was described to be sent from a server to each character controller. The action, however, may be received by each agent controller, which sends it to each character controller via the total system manager 2090. In this method, the total system

20 manager 2090 can detect all the situations occurring in the system. The total system manager 2090 can more easily realize an action of a character to "Speak" to all the other characters and make a character recognize the action of another character as the total system manager 2090 knows the

25 frame names in which each character controller resides, the number of expert agents or characters and the positions of

characters.

Embodiment 4

      If a user wants to revisit in future a specific web

5   site, he/she usually puts a bookmark on the URL of the web

site. The number of bookmarks thus stored is easily

increased as the user browses web sites. According to

Embodiment 4, agents or characters help user find a desired

web site easily.

10   Fig. 45 shows the entire configuration of a network

system 3010 including a user support system 3016 according to

Embodiment 4. A user terminal 3012 and a user support system

3016 are connected via the Internet 3014.

      The user support system 3016 comprises an originating

15 server 3020, a chat server 3024 and a gourmet server 3026,

which are connected to the Internet 3014. The originating

server 3020 comprises an electronic user utterance collection

created anticipating or assuming user utterance and an

utterance identification block to specify the user utterance

20 when it is inputted. The user utterance identification block

is commonly referred to from other servers in the system, for

example, the chat server 3024 and the gourmet server 3026.

The chat server 3024 and the gourmet server 3026 comprise an

electronic agent action collection created assuming the

25 action of an agent to respond to the user utterance and a

response block to make the agent respond to the user

utterance, respectively. The servers have the response
blocks independently within their nodes.

 5   The originating server 3020, the chat server 3024 and
the gourmet server 3026 are different network nodes so that
the process to specify user utterance and the process to make
an agent respond to the utterance can be conducted
simultaneously in different nodes. Agents can be made into
different nodes and the maintenance for each agent becomes
easier. The system 3016 may be composed as a single unit to

10   be implemented in a portal site. The servers, however, are
included in different nodes. The originating server 3020
behaves as a portal server for the user terminal 3012.

       A user utterance is first transmitted to the
originating server 3020, which specifies the utterance

15   referring to the user utterance collection. An agent which
should respond to the utterance is specified and the response
block executes a process for response. For example, an agent
in the chat server 3024 responds to general greetings such as
"Hello". An agent in the gourmet server 3026 responds to

20   meals, foodstuff and so on. Each expert agent supports to
find information needed for the user out of huge amount of
information by obtaining the needs of the user specified
during the conversation with the user.

       According to the present embodiment, when the user puts

25   a bookmark on a web site he/she likes, the bookmark
information is automatically classified into one of the

folders prepared for specialized areas. For example, when
the user puts a bookmark on a web site searched and presented
to the user by the gourmet agent, the URL of the site is
stored in a folder related to gourmet or a gourmet folder.
5   The bookmark information is presented or displayed to the
user such that it is classified in each folder.

The process in Fig. 45 is summarized as follows. A
local agent implemented within the user terminal 3012 appears
when the user initiates the user terminal 3012. The local
10 agent waits for the first or initial utterance of the user.
The initial utterance is sent to the originating server 3020
via the Internet 3014. The www browser in the user terminal
3012 displays a page in the originating server 3020.

The originating server 3020 is installed with a user
15 utterance collection which holds expected user utterances.
The initial utterance is searched in the user utterance
collection so as to be identified. An expert agent suitable
for the initial utterance is specified and the URL, which is
shown as "URLa/URLb" in Fig. 45, of the specified specialized
20 server is sent to the browser of the user terminal 3012. The
user terminal 3012 displays the image corresponding to the
page of the specialized server. The expert agent appears on
the screen. Each specialized server includes an agent action
collection for a respective expert agent and responds to the
25 initial utterance and further utterance of the user, which is
hereinafter referred to as a "general utterance". The action

of an agent is exemplified with an utterance hereinafter.
The action, however, may include a gesture and other behavior,
colors in the screen image, the change in texture, the search
operation of the agent and other program processes to respond
5 to the user.

When the user gives a new utterance or a general
utterance to the expert agent, the utterance is sent to the
originating server 3020. The originating server 3020 again
specifies an expert agent suitable for the utterance and
10 sends the URL of the specialized server to the user terminal
3012. A series of steps below is repeated.

1. specify the user utterance by the originating server 3020;

2. specify a specialized server to cope with the specified
   utterance;

15 3. respond to the user by the expert agent implemented in the
   specialized server;

4. encourage the user to input a new utterance.

In each cycle of the above process, the initial step is
always conducted by the originating server 3020.

20   In the above process, the expert agent, by searching
over the Internet, presents the user information needed by
the user. When the user requests to register a bookmark on
the web site having the presented information, a bookmark
register provided in the originating server 3020 stores the
25 URL of the web site in a folder corresponding to the
specialized area of the agent.

Fig. 46 shows the internal structure of the originating server 3020. Only the difference between Fig. 46 and Fig. 34 is now described.

The bookmark register 3050 stores in a bookmark file
5   3054 the URL of the web site upon request for the registration from the user. The bookmark information is classified and stored in one of the folders which is provided for the specialized area. A bookmark display unit 3052 displays the bookmark information stored in the bookmark file
10 3054 classified in the folders.

An index file 3036 is shown in Fig. 35 in Embodiment 3. A user utterance collection 3038 shown in Fig. 47 is almost the same as the one shown in Fig. 36 in Embodiment 3. In Fig. 47, however, files f267 and f306 relate to a restaurant or
15 gourmet.

Fig. 48 illustrates the internal description of an access information file 3046. The access information file 3046 is almost the same as the one shown in Fig. 37. In Fig. 48, however, "recipe" is replaced by "gourmet".

20   Fig. 49 shows the internal structure of the bookmark file 3054. The bookmark information registered by "user1" is classified and stored in "gourmet folder", "chat folder" and so on. Each folder stores a plurality of bookmarks. "Gourmet folder", for example, stores the URL "http://OO.com"
25 of the web site "Chinese restaurant B" as bookmark 1 information and the URL "http://XX.com" of the web site

"restaurant C" as bookmark 2 information.

Fig. 50 shows the internal structure of the gourmet server 3026 as an example of specialized servers. A communication unit 3060 communicates with the user terminal 3012, the originating server 3020 and the like via the Internet 3014. The URL specified by the utterance search unit 3034 of the originating server 3020 is input to an agent action library 3062 via the communication unit 3060. The agent action library 3062 includes agent data 3072 which describes the expert agent utterance, image and behavior. Each URL specified by the utterance search unit 3034 has a page corresponding thereto.

In Fig. 50, the page 64 corresponding to the URLa1 is illustrated. The page 64 includes an agent output unit 3070, a user utterance acquiring unit 3074 and a specific process execution unit 3076. The agent output unit 3070 responds to the user utterance with the gourmet agent based on the agent data 3072. The specific process execution unit 3076 conducts processes other than response by utterance. The specific process or purpose execution unit 3076 may execute various programs. A search unit 3078 searches information requested by the user via the Internet 3014. For example, the utterance which leads the user to the page is "Teach me good restaurants in New York", the gourmet agent searches for restaurant information via the Internet 3014 and presents the information to the user. The user utterance acquiring unit

3074 acquires general utterances of the user and transmits
them to the originating server 3020, which specifies a
specialized server again.

Fig. 51 shows the internal structure of the user
terminal 3012. A communication unit 3130 communicates with
the originating server 3020, the chat server 3024, the
gourmet server 3026 and the like via the Internet 3014. A UI
3138 may be a keyboard, a mouse, a display apparatus and
various data interface formats. A local agent output unit
3132 provides local agent data 3134 to the user via the UI
3138. The initial utterance and general utterances of the
user are acquired by a user utterance input unit 3136 via the
UI 3138. The acquired utterance is sent to the originating
server 3020 via the communication unit 3130 and the Internet
3014.

Fig. 52 illustrates a screen 3150 displayed when the
user terminal 3012 is initiated. A local agent 3152 appears
and says "Welcome! Let's chat". The user inputs "Hello" in
an input area 3154 and sends it. The input "Hello" is sent
to the originating server 3020 as the initial utterance, from
which the chat server 3024 as a specialized server is
specified. The user terminal 3012 accesses a page in the
chat server 3024.

Fig. 53 illustrates the screen 3150 displayed after the
above process. Chat Agent 3156 is displayed. In the present
embodiment, the local agent 3152 is the same as Chat Agent

3156 by appearance so that a seamless conversation continues. A bookmark button 3190 is displayed by the bookmark file 3054 on the screen. When the user pushes the bookmark button 3190, the bookmark information stored is displayed with the folders.

5 Chat Agent 3156 speaks "Hello! I am Chat Agent Pea-ko…". The user inputs in the input area 3154 "Let me know a restaurant serving good Peking ravioli". The utterance is acquired by the originating server 3020 which identifies a page in the gourmet server 3026. The URL of the identified page is sent

10 to the user terminal 3012, which accesses to the page.

Fig. 54 illustrates the screen 3150 displayed after the above process. Gourmet Agent 3160 appears and speaks "All right! Trust me. I am Gourmet Agent." The search unit 3078 searches over the web pages using a keyword "Peking ravioli". The agent speaks "Wait for a moment. I will come back soon."

15 not to be silent and to let the user know the search process is in progress. When the search is finished, a page to display the search result is displayed.

Fig. 55 illustrates the screen 3150 displaying the page

20 for the search result. The titles 3170 of the web pages obtained by the search unit 3078 are displayed. Each title 3170 is linked to the web page so that the user can easily access thereto. When the user clicks a register button 3180, the corresponding URL of the web site is stored in the

25 gourmet folder contained in the bookmark file 3054.

Fig. 56 illustrates the screen 3150 displaying the

registered bookmark information. When the user clicks a
bookmark button 3190, a folder list 3192 is displayed by the
bookmark display unit 3052. When the user puts a cursor on
the gourmet folder, the titles 3194 of the web sites stored
5 in the gourmet folder appear. The user can access to the URL
of the web site when the user clicks a title.

A few modifications of the present embodiment are as
follows.

In the present embodiment, the utterance identification
10 block is installed in the originating server 3020 and is
commonly used by a plurality of servers. Each specialized
server, however, may have its own independent utterance
identification block and response block. In this
configuration, each server can manage its own user utterance
15 collection and agent action collection so that the management
and maintenance of the agent become easier within the server.
A core server to process all the utterances may be provided
even in this configuration.

In the present embodiment, the images of the local
20 agent 3152 and Chat Agent 3156 are made identical.
Naturally, it is not necessary to match them. The local
agent 3152 may not be installed in the user terminal 3012.
Instead, an "opening agent" or the like which appears when
the user terminal 3012 is initiated may be implemented in the
25 originating server 3020.

In the present embodiment, the bookmark register 3050,

the bookmark display unit 3052 and the bookmark file 3054 are provided in the originating server 3020. These units naturally may be implemented in other specialized servers or in the user terminal 3012.

5   In the present embodiment, each folder in the bookmark file 3054 corresponds to each specialized area of a specialized server. Naturally, folders may be classified on an arbitrary criterion. For example, the system may request the user to designate a plurality of folders and to suggest
10 which folder to be associated with which kind of web sites. When a web site is requested by the user to be registered, the type of the web site may be analyzed referring to the user utterance collection to specify a specialized area. A bookmark is then put on the web site and is stored in the
15 folder associated with the specified specialized area. According to this method, the bookmark information already stored in the user terminal 3012 may be reclassified.

The folders in the bookmark file 3054 may be prepared beforehand or may be generated or modified by adding new
20 folders requested from the user or any expert agents. The bookmark information may be classified when it is stored upon request from the user or may be classified later as mentioned. As long as the bookmark information can be classified and stored to help the user revisit the web site he/she likes,
25 many modifications for creating folders are available.

Embodiment 5

The whole network system including a user support system according to Embodiment 5 is the same as Fig. 45 of Embodiment 4.

5   The user support system according to Embodiment 5 requests the user to register the items of information he/she is interested in and therefore searches frequently. By this registration, search process can be immediately initiated when the user utterance relates to the information items. In

10   this system, the search is also conducted even without the user utterance so that the search result can be presented immediately. User utterances to be a trigger to start the search or to display the search result are predefined to present the information timely to the user.

15   A character imitating a human or an animal is used to present the information to the user in such a manner that the character seems to perform the search spontaneously. By employing the character, even beginners of PCs or the like can feel relaxed. Each character is corresponded to each

20   specialized area of information and the user can easily understand to which area the information now being processed belongs watching the character. Characters which are in charge of the areas the user is interested in and conducts frequent search often appear to chat with the user. The user

25   intimately interacts with the characters.

Such characters may be registered as "favorite

characters" so that the user can call them instantly.
Favorite characters are so configured that the user can
register the URLs of web sites he/she likes in areas related
to the characters, which present renewal information of the
5   web sites to the user. Each character stores the URLs of the
web sites which fall within the specialized area the
character is associated with. In this configuration,
bookmarks can be classified according to specialized areas as
the characters virtually work as folders for the bookmarks.
10   The user does not need to confirm whether information is
updated or not in the web sites as the character informs the
user of the situation. The character may inform the
situation periodically spontaneously or when the user
utterance relates to the web sites.
15   The favorite characters may be raised by the user. A
"character house" may be displayed on the screen in which the
characters live. The attributes of the characters may change
based on the attitude or behavior of the user on the
characters. The characters may behave differently according
20   to the attributes. The attributes may include "cheer", which
becomes larger when the user handles the character gently and
becomes smaller when the user mishandles the character. A
character with the "cheer" attribute being large may
frequently conduct the search, whereas a character with small
25   "cheer" attribute may stop working until the attribute is
recovered. Such design of characters gives amusement to the

user.

        The major process flow of Embodiment 5 is almost the
same as Embodiment 4 and the difference is described. The
user utterance collection includes an additional utterance
5   collection which contains expected utterances to trigger the
search by expert agents.

        When the initial utterance of the user is detected in
the additional utterance collection, the process jumps to a
page to conduct search and displays the search result. In
10 the page, a process flow is written such that the search is
performed based on the data the user registered beforehand
and that the search result is presented to the user via the
character. In another example, the situation whether the web
site registered is updated or not is acquired and presented
15 to the user via the character. In these examples, the
process itself jumps to the page for the search. Alternately,
an instruction to start search is sent to an expert agent so
that the search process is performed as a background process.
When the background process is performed, the conversation
20 between the character and the user may be continued.

        With regard to general utterances which follow the
initial utterance, the process is almost the same as
Embodiment 4. A series of process, however, is slightly
different as follows.
25 1. specify the user utterance by the originating server 4020;
2. specify a specialized server to cope with the specified

utterance;

3. respond to the user by the expert agent implemented in the specialized server;

4. perform information search and display the search result;

5   5. encourage the user to input a new utterance.

Fig. 57 shows the internal structure of the originating server 4020. Now only the difference from Fig. 46 is described.

Each utterance has one corresponding file within the
10 user utterance collection 4038. The URL of a page to respond to the user utterance is described in each file. The content of the additional user utterance collection 4039 is included in the user utterance collection 4038 although they are separately shown in Fig. 57 for the convenience of
15 understanding.

The URL detected in the user utterance collection 4038 or in the additional user utterance collection 4039 is transmitted to the browser of the user terminal 4012 via the communication unit 4030. The browser then connects to the
20 designated specialized server containing the page.

The internal structure of the index file 4036 is the same as Fig. 35. The internal structure of the user utterance collection 4038 is the same as Fig. 47. The internal description of the access information file 4046 is
25 the same as Fig. 48.

Figs.58 and 59 show the internal structure of an

additional index file 4037 and the additional user utterance

collection 4039, respectively. These components are included

in the index file 4036 and the user utterance collection 4038,

respectively, but they are shown as independent components.

5   The additional index file 4037 comprises an alphabet column

4200, a user utterance column 4202 and a file name column

4204. User utterance is sorted in an alphabetic manner.

The additional user utterance collection 4039 comprises

a file name column 4204, a user utterance column 4202 and a

10 page column 4220 to indicate a specialized server to respond

to the user. When the user utterance is "renewal", the page

of the responsible specialized server is "URLa203" and the

combination of "renewal" and "URLa203" composes the file f804.

The additional index file 4037 and the additional user

15 utterance collection 4039 are linked through file names. For

example, the utterance "new arrival" is contained in the file

f805 in the additional index file 4037, which is in turn

associated with the file f805 in the additional user

utterance collection 4039.

20   Fig. 60 shows the internal structure of the gourmet

server 4026. Now only the difference from Fig. 50 is

described.

The specific-purpose processor 4076 in the page 64 of

URLa1 performs information search in addition to the

25 counterpart in Fig. 50.

A favorite register 4080 registers the gourmet agent as

a favorite data 4082 upon request from the user. The

favorite register 4080 also registers the content of

information the user wishes to search and the URLs of the web

sites as the favorite data 4082 upon request. A character

5   manager 4084 manages the attributes of characters and changes

the values in accordance with the treatment of the characters

by the user. The attributes are also stored as the favorite

data 4082.

Fig. 61 shows the internal structure of the favorite

10   data 4082. The favorite data 4082 is partitioned to a user

name column 4300, a search object column 4302, a character

attribute column 4304 and bookmark columns 4312, 4318. The

search object column 4302 stores the content of information

the user wishes to search. The character attribute column

15   4304 comprises an age column 4306, a cheer column 4308 and an

intelligence column 4310, which are managed by the character

manager 4084. These attributes are referred to when the

characters are displayed on the screen. The bookmark columns

store the bookmarks user puts on web sites. Each bookmark

20   column contains a URL column 4314 and a last view column 4316

which indicates when the user made the last view on the URL.

Fig. 62 shows the structure of a page stored in the

agent action library 4062. The page is used for information

search. A specific-purpose processor 4076 of the URLa2 page

25   66 contains an information search unit 4077 to search

information requested by the user via the Internet 4014 and a

spontaneous search unit 4078 to start the search process
spontaneously. The information search unit 4077 and the
spontaneous search unit 4078 acquires URL information and the
content object stored in the favorite data 4082 when they

5   start the search. The spontaneous search unit 4078 decides
the search frequency referring to the attributes of a
character stored in the favorite data 4082. The search
result is presented to the user in the form of a character
utterance by a character displaying unit 4071 in an agent

10   output unit 4070.

The internal structure of the 4012 is the same as Fig.
51. The initial screen of the 4012 is the same as Fig. 52.
The process shown in Figs.53 and 54 is also performed in this
embodiment. In the process, it is assumed that the user

15   inputs "Teach me a good restaurant famous for Peking ravioli".
The gourmet agent responds to the request and conducts the
search. When the search is finished, the process jumps to a
page to display the search result.

Fig. 63 shows the screen 4150 displayed based on the

20   page. On the screen, the titles 4170 of the web pages
acquired by the information search unit 4077 are displayed.
The favorite register 4080 registers the gourmet agent as a
favorite character when the user clicks a register button
4180.

25   Fig. 64 shows the screen 4150 in which the favorite
register 4080 accepts the registration of a bookmark from the

user. A bookmark is registered in the favorite data 4082
when the user fills the URL of a web site he/she likes in a
URL column 4192 and clicks a register button 4190. A
bookmark may be registered when the user clicks a bookmark

5   register button (not shown) while he/she views the web site.

Fig. 65 shows the screen 4150 in which a favorite
character registered by the user is displayed. A character
house 4194 in which the favorite character lives is displayed.
A search process is initiated when the user inputs "Do you

10   have any arrivals?" as the user utterance is contained in the
additional utterance collection.

Fig. 66 shows the screen in which Gourmet Agent 4160
presents the search result. Gourmet Agent 4160 tells that
two sites among those the user have registered have been

15   renewed. The last view column 4316 in Fig. 61 is referred to
in order to select sites which were renewed after the last
view. Whether the registered web sites have been renewed or
not may be checked when the user utterance relates to at
least one of the web sites. Alternately, the registered web

20   sites may be monitored periodically and renewed sites may be
informed to the user when a user utterance is made.

In the present embodiment, the favorite register 4080,
the favorite data 4082 and the character manager 4084 are
implemented in a specialized server. These units, however,

25   may be implemented in the originating server 4020 to be
centrally managed thereby. The favorite data 4082 may be

stored in the user terminal 4012. In this case, favorite
characters may be designed as local agents to serve for the
user in the user terminal 4012.

    Although the present invention has been described by
way of exemplary embodiments, it should be understood that
many changes and substitutions may be made by those skilled
in the art without departing from the spirit and the scope of
the present invention which is defined only by the appended
claims.